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V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

Assistant Editor: A. R. PARKES, M.I.B.F.
Commercial Editor: P. E. CARDEN.

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER
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JOHN ADAM HOUSE,
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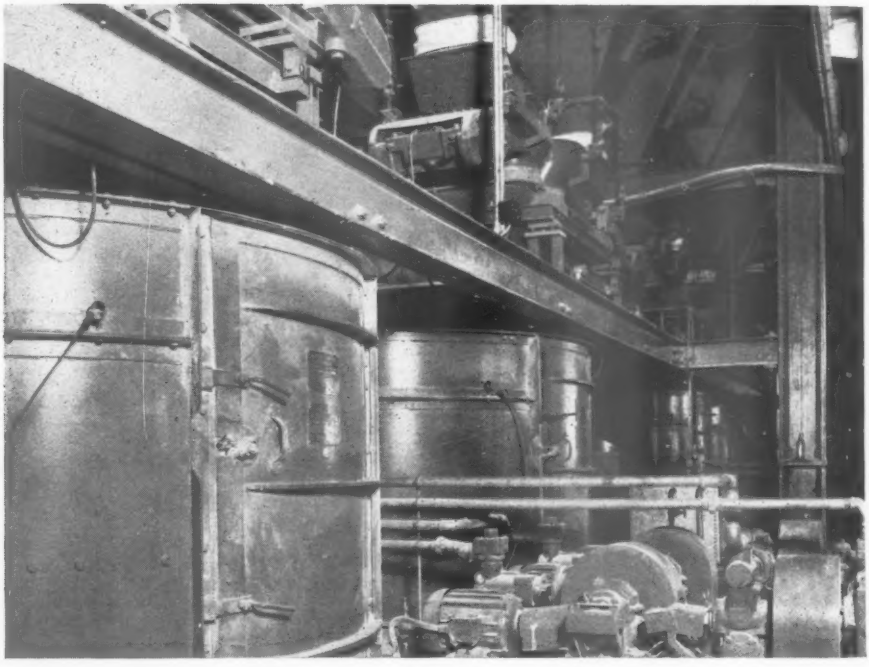
Automation IN CORE SAND MIXING at the New Ford Foundry



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FOUNDRY
TRADE JOURNAL

Vol. 105 DECEMBER 4, 1958 No. 2199

"Comments on the Job"*

A Report carrying the above title covers an investigation made in six works in which nearly 1,700 people, of whom 541 were executives, were encouraged to voice their "grouses" and appreciation of their jobs. They made over 11,000 comments. Because of the breadth of the survey, it can be assumed that the incidence of a morning "liver," misunderstandings, passing quarrels, or momentary jealousies, can be ruled out as having no effect on the conclusions to be drawn. The salient points have been summarized in the Report and show discontent brought about in connection with planning and control procedures, time standards, maintenance and stores, promotion, pay—especially incentives, and more complaints coming from men than women—inadequate definition of responsibility and liaison weaknesses. A conclusion we draw from this Report is that the comments made by women were more useful than those made by the men.

There are dozens of actual comments printed, some of which, if deposited in a "suggestion box," would certainly qualify for prizes. Time-study comes in for much criticism and quality was alleged to deteriorate when only quantity counted for pay. One of the country's leading industrialists, whose firm has been particularly successful in applying time-study, wrote us some time ago that he regarded it as a lethal weapon, only to be handled by the highest executives and not to be carelessly delegated. The Report's comments on promotion are both apt and inept and we doubt whether a fixed policy is desirable for a firm, whether of advancing its own employees to fill vacancies arising or of bringing in men from outside, as so much depends on the "material" available. It is very difficult for a man to start "bossing" his former workmates. Canteens came in for criticism in the comments recorded and vigorous derogatory remarks were made about the behaviour of the staff. As would be expected, there were many complaints as to the lack of communication between higher management and the shop floor.

It is obvious from a study of this Report that there are dozens of topics of fruitful conversation between management and men. Bearing all these in mind, it would be a good idea, when the manager is touring the shops for him to bring up a different subject with each man with whom he has a word. By following this plan, he would, after a few rounds of the shops, learn which were important and therefore needing attention, and which could be dismissed as being generally satisfactory. Obviously, in such a survey, the foremens' co-operation should be sought—he may know all the answers! We strongly urge employers to acquire this Report.

*Report No. 13 issued by the National Institute of Industrial Psychology, 14 Welbeck Street, London, W.1.

European Foundry Apprentice Competition*

British boys came third, seventh and fourteenth in the second international foundry apprentice competition held under the aegis of the European Committee of Foundry Associations—staged in Paris from November 24-29. They were respectively: Peter Leslie Warnes, a steelfounding apprentice with English Steel Castings Corporation, Limited, Michael Tobin, an ironfounding apprentice with the Metropolitan-Vickers Electrical Company, Limited, and Denis Perkins, also an ironfounding apprentice, with Stanton Ironworks Company, Limited. All three are aged 19, and were chosen to take part after practical and written examinations. Prior to these, invitations had been sent to all foundries to submit the names of candidates, and an organizing committee composed of representatives of the Council of Ironfoundry Associations, the British Steel Founders' Association, the Association of Bronze and Brass Founders, the Light Metal Founders Association, and the Institute of British Foundrymen made a final selection after preliminary tests, which were conducted by the IBF.

Fifteen apprentices took part in the competition, coming from six different countries. A French apprentice came first followed by an Italian. In the team contest, run concurrently with the individual competition, the United Kingdom was placed third. The next competition in the series will take place in early 1960 in the United Kingdom.

* See JOURNAL, November 20, p. 633, for competition details.

British Standards Institution

Tyres for Crane Rail-wheels (B.S.3037 : 1958)

A new publication of the British Standards Institution is an 11-page illustrated British Standard the purpose of which is "to limit the range of tyres for crane rail-wheels, and to standardize dimensions and tolerances." Prepared by a BSI committee of experts, the publication is the first of what it is hoped will become a series on data for certain crane components (including further types of tyre). The size range of the double-flanged tyres extends from 18-in. dia. by 4½-in. wide to 36-in. dia. by 9½-in. wide. The clauses cover: dimensions, material, freedom from defects, Brinell hardness, re-tests, inspection, and testing facilities. The publication concludes with an appendix which provides useful notes on manufacture.

Copies of this Standard may be obtained from the sales branch of the Institution, at 2, Park Street, London, W.1; price 4s., plus postage.

BCIRA Proposed Conference on Methods of Analysis of Cast Iron

The British Cast Iron Research Association is proposing to hold during the first half of 1959, a conference on methods of analysis of cast iron, organized through the sub-committee charged with that section of its activities. The venue is likely to be London and a provisional programme, including nine papers, a number of films and a small exhibition, has been drawn up. Those members of the Association interested in sending representatives to this conference are asked to inform the Association's intelligence manager, Mr. G. R. Woodward, from whom further information may be obtained.

Forthcoming Events

DECEMBER 8

Institution of Production Engineers

Leeds section: "A Modern Foundry for the Manufacture of Small Steel Castings by New Moulding Techniques," by J. H. Osborn, 7 p.m., at the Hotel Metropole, Leeds.

East and West Ridings section: "Argon-arc Welding of Corrosion- and Heat-resisting Steels," by J. A. McWilliam, 7.15 p.m., at the Grand Hotel, Sheffield.

DECEMBER 9

Institute of British Foundrymen

Coventry and district section: "Gating for Production for High-duty Irons," by L. Clarke, 7.30 p.m., at Coventry Technical College, Room A.5.

Manchester Association of Engineers

"Application of Hydraulics in Industry," by J. R. Fawcett, 6.45 p.m., at the Engineers' Club, Albert Square (joint meeting with the Incorporated Plant Engineers).

Institution of Production Engineers

London graduate section: "Investment Castings by Centrifugal Methods," by I. L. Gwynn, 7.15 p.m., at 10, Chesterfield Street, London, W.1.

DECEMBER 10

Institute of British Foundrymen

Birmingham branch: "Aluminium Castings," by J. Vickers, 7.15 p.m., at the Queen's Hotel.

Combustion Engineering Association

"Carrying out a Heat Balance in a Plant," by H. H. Grattidge, 10.30 a.m.; at 2.30 p.m., "Planned Maintenance," by T. W. Fishlock. Meeting to be held at the Central Hotel, Glasgow, C.1.

Institution of Production Engineers

Liverpool section: "Materials Handling—A Challenge to British Industries," by A. G. Havek, 7.30 p.m., at the Liverpool Technical Libraries, William Brown Street.

Luton graduate section: "Railway Modernization," 7.30 p.m., in the Mayor's Parlour, Town Hall, St. Albans.

DECEMBER 11

Institute of British Foundrymen

Beds & Herts section: "Production of a Cylinder-head Casting," by L. W. Bolton, 7.30 p.m., at the Town Hall, Luton.

Incorporated Plant Engineers

North East branch: "Atmospheric Pollution," by B. Richardson, 7 p.m., at Roadway House, Oxford Street, Newcastle-upon-Tyne.

Institution of Production Engineers

Sir Alfred Herbert Paper—"European Common Market, its Origins and Implications," by Sir Cecil Weir, 6.30 p.m., at the Royal Institution, Albemarle Street, London, W.1.

North-East Metallurgical Society

"Bearing Metals from the User's Viewpoint," by R. J. Brown, 7.15 p.m., at the Cleveland Scientific and Technical Institution, Middlesbrough.

Institute of Metals

Sheffield local section: "X-ray Microscopy," by W. W. Nixon, 7.30 p.m., in the Engineering Lecture Theatre, The University, St. George's Square.

Liverpool Metallurgical Society

"Metallurgical Applications of High-resolution Electron Microscopy," by J. Nutting, 7 p.m., in the library of the Department of Metallurgy of the University of Liverpool, 146, Brownlow Hill.

DECEMBER 13

Institute of British Foundrymen

Newcastle and district branch: "Safety and Good Housekeeping in Foundries," by H. H. Tranter, 6 p.m., in the Neville Hall, Westgate Road, Newcastle-upon-Tyne.

Scottish branch: "Problems encountered in a Light-castings Foundry," by James A. McIntosh, 3 p.m., at the Royal College of Science and Technology.

H.R.H. THE DUKE OF EDINBURGH visited the Woolwich works of Siemens Edison Swan, Limited on November 25.

Rebuilding of Union Iron Works

An account of the extension and improvement of the premises of John Hall & Son (Oldham), Limited

In contrast with reports and rumours of the closing down of what have hitherto been regarded as important foundries, it is reassuring to learn of the rebuilding and extension of the premises of John Hall & Son (Oldham), Limited. Those who study trends might interpret this as another example of specialists taking over work previously undertaken in " tied " foundries; but the quality of the castings produced in the new shops is certainly very high.

Towards the end of last month, John Hall & Son (Oldham), Limited (a firm established about a century ago) staged an opening ceremony for their remodelled iron foundry, the main bay of which has been completely rebuilt. The Mayor of Oldham, Councillor James Bradley, performed the ceremony (Fig. 1) and thereafter the works was opened for inspection by a party of about 60 guests, including representatives of customers, supply houses, contractors, Local Authorities and Press. At the conclusion of the tour, luncheon was provided for the visitors in a marquee erected on the works' grounds, and guests were given literature about the activities of the firm and were able to discuss work in progress with the directors and staff. Special thanks from the visitors were accorded to Mr. Dronsfield Snr., Mr. Dronsfield Jnr. and Mr. H. Stone, all directors of the firm, who had been conducting parties around the works, as well as to the senior executives.

Development Projects

Iron castings have been produced in this foundry for the greater part of a century. Strategically located in a large industrial area, it has served the many and varied engineering and chemical industries around, as well as those further afield—the trade name, " Unihall," now being recognized as the firm's mark for quality castings. Some 50 years ago, the early directors at John Hall's approached their principal customers for assistance in rebuilding the small foundry which was then serving their interests, and this was accomplished by new investment. Recently, however, the company again be-

FIG. 1.—*The Mayor of Oldham, Councillor James Bradley, cutting the ribbon at the opening of the new premises of John Hall & Son (Oldham), Limited.*

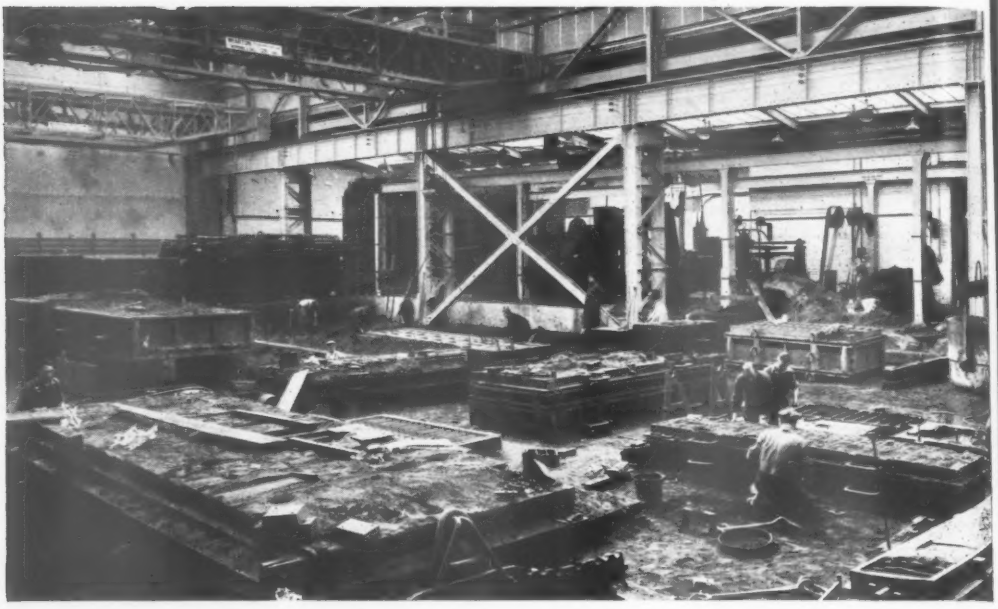


FIG. 2 (*above*).—*View of Hall's new foundry bay, showing the space available for heavy jobbing work. The sand plant and Hydroblast chamber can be seen in the background.*

FIG. 3 (*left*).—*Setting the cores in a mould for producing a* 24-*ft. slide-bed for Dronsfield's roll-grinding machine (for finished casting, see Fig.* 6b).

came faced with a similar need in that, due to the age of the building, extensive repairs had become necessary which involved a considerable outlay, and all this was at a time when trade was slackening off, capital was scarce, and, for one reason or another, a number of foundries throughout the country were being closed down. However, it was decided that a long-term policy must be boldly pursued and the project of re-roofing the foundry, increasing crane capacity, and making more efficient use of floor space, must be carried through. This work has now been completed.

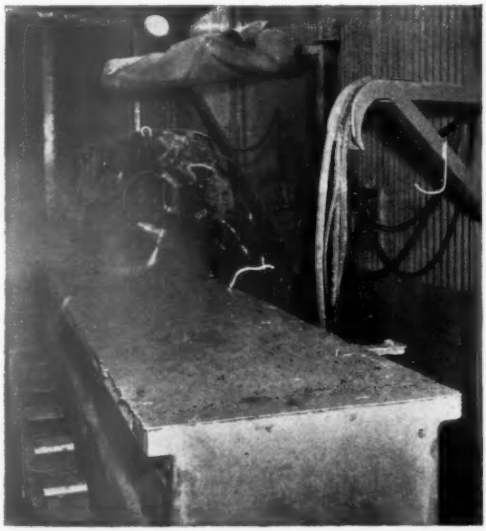
The new foundry (Fig. 2) covers a floor area of 16,000 sq. ft. and is now a good example of industrial premises well suited to their purpose. The main building has a 60-ft. crane span and is 200-ft. long, with a height of 22 ft. to the crane rails. The reconstruction was carried out on a two-stage plan, with a split about on the centreline of the cupolas, which are arranged roughly in the mid-side of the new bay. As the first stage was completed by working "round the clock," foundrywork recommenced in this section while the second stage of the constructional work was undertaken. The single-ridge roof carries two lines of glazing in each pitch and Colt ventilators have been incorporated. The sides of the building are clad in Noral

aluminium sheet, interlined with Asbestoluc sheeting to confer both fire-resistance and thermal insulation. A special point has been made of carrying the vertical stanchion bases 6 ft. below the new foundry level, this with the objective of permitting pit-moulding close to the building line. Of the two travelling cranes installed (made by Wharton Crane & Hoist Company, Limited), one is of 35 and the other of 25 tons capacity; both have been fitted with one-ft. per min. creep-lifting gear and controls.

Equipment

The general equipment of the foundry is typical of that suited to the production of quite large castings (running from ounces up to 30 tons) on a jobbing basis. Thus, apart from one Pneulec Herman 2,000-lb. turnover machine, there are only one or two small moulding machines in the older section of the works and none at all in the new bay, which is devoted entirely to heavy box, pit and loam moulding, as shown in Fig. 3. For the metal supply, three Jackman cold-blast cupolas, one of 10 tons, one of 3½ to 4, and one of up to three tons per hr., are installed, together with a cupolette melting about 25 cwt. per hr. For the larger furnaces—in alternate use—an inclined-hoist type of charger has recently been erected to deliver into either furnace by way of a reversible chute. Drying of cores and mould parts is carried out in two large Mirrlees Watson drying stoves, one at the side and one at the end of the foundry. For cleaning the heavy castings, the company have installed a Hydroblast plant (Fig. 4), embodying one of the largest blasting chambers ever inspected by the writer (it can accommodate castings of 25 ft. and longer); together with full equipment for sand reclamation. Sand treatment consists in taking reclaimed sand from the Hydroblast, and milling in a batch-type plant with generous additions of a local red sand, together with Dursland yellow, the latter having a high clay-content. For cleaning the smaller types of castings, use is made of a Tilghman's barrel-type Wheelabrator (Fig. 5), equipped with its own self-contained dust collector and separator. For control of the production, there is a well-equipped laboratory, as many of the castings are of high-duty cast iron. Spent hops from a local brewery are used as a valued ingredient of the moulding sand to replace manure, which in this foundry is now regarded as out-dated.

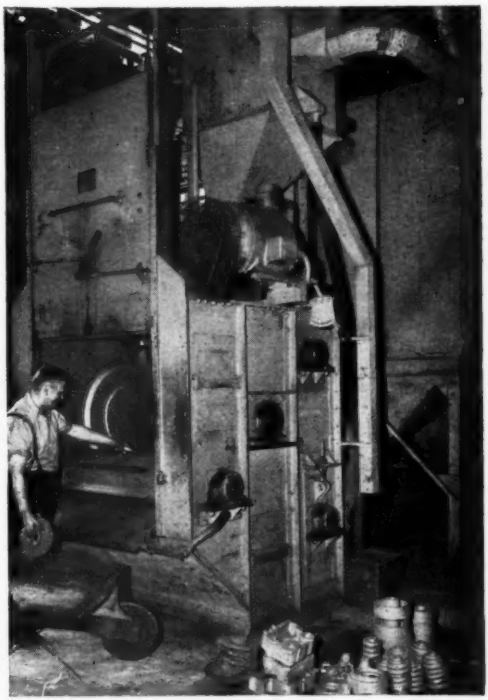
FIG. 4.—*Double-operator Hydroblast chamber; a slide-bed casting is shown being cleaned.*



Operating Practices

As already intimated, the basic ingredient of the operating practices at John Hall's is highly-skilled moulding, and it is interesting to record that special contracts were entered into between the skilled moulders and the management during the unavoidable five-months shut-down while rebuilding was proceeding. In actual fact, these men were paid average past earnings during this period, and in return, the company are proud to record that the men involved took on even the roughest of labour-

FIG. 5.—*Smaller castings produced by John Hall's are cleaned in this Wheelabrator plant, typical examples being shown in the foreground.*



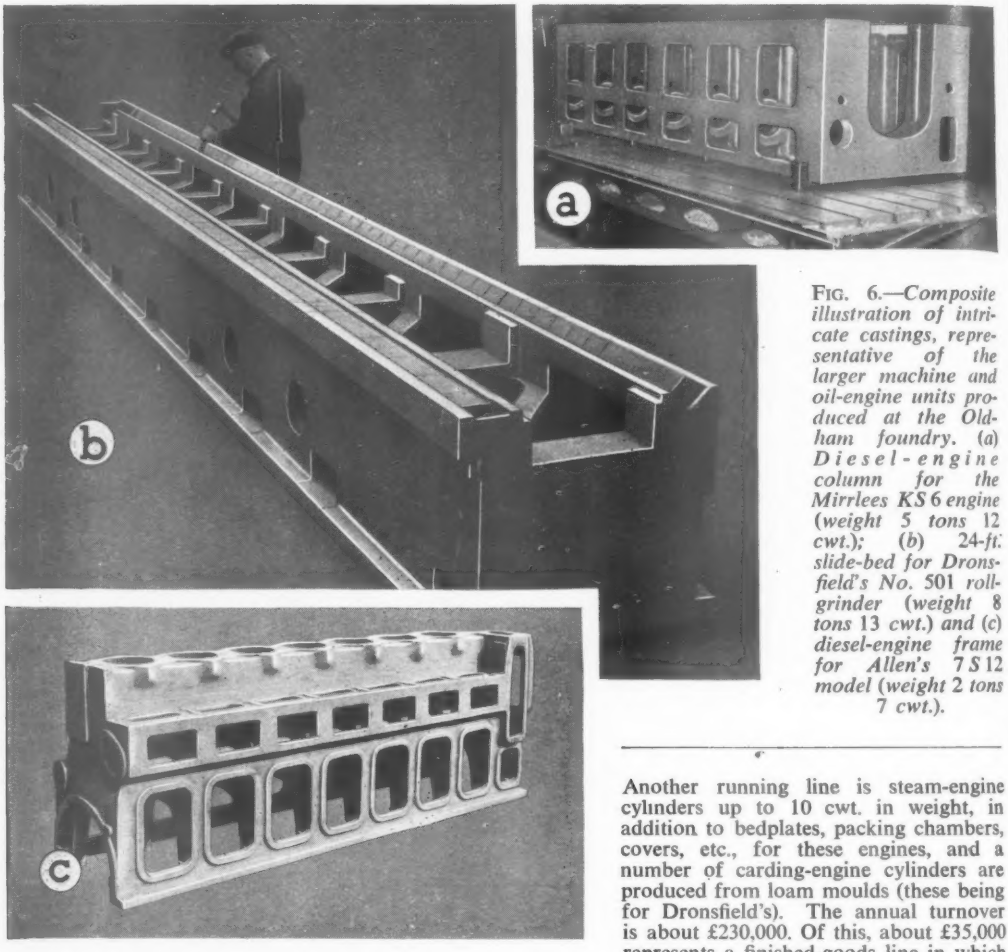


FIG. 6.—*Composite illustration of intricate castings, representative of the larger machine and oil-engine units produced at the Oldham foundry. (a) Diesel-engine column for the Mirrlees KS 6 engine (weight 5 tons 12 cwt.); (b) 24-ft. slide-bed for Dronsfield's No. 501 roll-grinder (weight 8 tons 13 cwt.) and (c) diesel-engine frame for Allen's 7 S 12 model (weight 2 tons 7 cwt.).*

ing jobs in the worst of weather to help the job forward. Of the total complement of 138, only about 5 per cent. of the employees are unskilled.

The practice is to melt metal during the afternoons, five days per week, the basis metal having from 0.19 to 0.5 per cent. phosphorus; at present there is no demand for alloys in the metal produced. Very little CO_2 moulding is carried on, as the patterns are for the most part of large single-piece construction. Credit is due to the employees and staff for the fact that during the whole of last year the total scrap was under 2½ per cent.; and this year the amount is running much at the same figure.

Ranges Undertaken

Of the large variety of castings produced (Fig. 6) both for the company's own lines, and for Dronsfield Bros., Limited, Oldham (of which John Hall's is a wholly-owned subsidiary), probably the largest proportion is of oil-engine bases and cylinder-heads, these being produced up to about 10 tons in weight.

Another running line is steam-engine cylinders up to 10 cwt. in weight, in addition to bedplates, packing chambers, covers, etc., for these engines, and a number of carding-engine cylinders are produced from loam moulds (these being for Dronsfield's). The annual turnover is about £230,000. Of this, about £35,000 represents a finished-goods line in which the company enjoys a well-established reputation, namely, Unihall fire-escape staircases, walkways, etc. The castings used in these are now of course confined to stair treads, landing plates and the like.

The brochure, which John Hall's handed to visitors at the opening ceremony, describes first the new premises, continues with illustrations of the new foundry and, thereafter, shows a number of typical castings produced. Amongst customers, are recorded the names of several firms prominent all over the world as engine builders, including Ashworth Parker, W. H. Allen, and Mirrlees, Bickerton & Day.

(Giving credit for help in the reconstruction, the firm mentions indebtedness to its contractors: Frank Wall & Company, Limited (electrical); DEW of Oldham (civil engineering); Edward Wood & Company, Limited (steelwork); Mellowes & Company, Limited (glazing), and C. S. Allott & Son (consulting engineers). Finally, mention is made of the helpful co-operation of customers during the period, which, by permitting manufacture of castings, etc., in advance of actual requirements, enabled the work of reconstruction to go forward without disruption of engine-building programmes.)

American Letter

New Cuban Shipyard

According to a recent report in the American Press, the Cuban government is going into the shipbuilding industry. Construction of the first shipyard, at Mariel, 40 miles west of Havana, will be started before January 1. It is primarily intended to build approximately 25 ships, of 5,000 tons each.

President Batista, representatives of the National Bank of Cuba, and several British shipbuilding firms, have signed an agreement creating an Anglo-Cuban company named "Astilleros del Mariel, S.A."

This agreement to build a shipyard at Mariel was the result of conferences in London, in October, 1957, between Dr. Joaquin, of the National Bank of Cuba, and British shipbuilders, contractors, and consulting engineers. The shipyard will be joint property, with the Cubans holding 60 per cent. of the shares in the enterprise and putting up 60 per cent. of the capital, and British firms holding the remainder. It is estimated that the deal will involve 85 million dollars.

Hoyt Memorial Lecturer

William J. Grede, president, Grede Foundries, Incorporated, Milwaukee, has been selected by the American Foundrymen's Society lecture committee as the Charles Edgar Hoyt Memorial Lecturer for 1960. Mr. Grede, winner of the AFS McFadden Gold Medal in 1953, was the first chairman of the Wisconsin Chapter, and a leader in the first AFS foundry conference held at the University of Wisconsin. He has also been active in AFS committee work and is past-chairman of the AFS cost committee. Mr. Grede has been active in other technical societies, and is a past-president of the National Association of Manufacturers.

"Columbium" Endorsed

The board of directors of the American Institute of Mechanical Engineers, at its last meeting, passed a resolution endorsing columbium as the proper name for the 41st element. This action is in opposition to the International Union of Pure and Applied Chemistry and the American Chemical Society, both of which have endorsed niobium as the rightful name.

Members of the Institute were urged to adopt the name columbium, if they had previously used niobium. This particularly applied to authors who were presenting papers at meetings or preparing papers for publication, as it was only by abstention from using the term niobium that it would, at some future date, be entirely forgotten, and the erroneous results of some nineteenth-century research finally laid to rest.

New Technical Paper Award

A new award, known as the Gray Iron Division Award, has been approved by the American Foundrymen's Society board of directors. It will be given in recognition of outstanding contributions to published literature on the manufacture, use, or properties of grey cast-iron.

To be eligible, papers or publications must:—

(*a*) Be an English-written manuscript submitted prior to deadline date; (*b*) be selected by the programme and papers committee of the Gray Iron Division for inclusion in the official programme of the Society for its annual meeting, in the year for which the award is granted; (*c*) deal with some aspect of the manufacture, use, or properties of grey cast-iron, and (*d*) be acceptable for publication in AFS *Transactions*.

Papers will be evaluated chiefly on the expected value of the publication to the grey-iron industry as a whole, or to specific segments. Other factors in selection are timeliness of content; adherence to publication procedures and recommendations; readability; organization of manuscript; adherence to principles of good grammar and spelling, and neatness of manuscript.

Material-handling Exposition

The Material Handling Institute, Incorporated, will hold their Exposition next year at the Public Auditorium, Cleveland, from June 9 to 12. A large number of American manufacturing firms will exhibit their latest models of lift-trucks, cranes, conveyors, hoists, floor trucks, pallets, metal containers and auxiliary equipment. Further details may be obtained from: Overseas Information Bureau, Material Handling Institute's Exposition (1959), Room 758, One Gateway Center, Pittsburgh 22, Pennsylvania, USA.

Forthcoming Conferences

The American Foundrymen's Society will hold their 63*rd Castings Congress* in Chicago next year from April 13-17. Combined with it will be the *Engineered Castings Show*.

Courses for Technical Salesmen

An attempt is being made in Birmingham to solve a problem which faces many industrial concerns, namely, how to be effective in selling products which incorporate an increasing amount of technical know-how. Some technical sales problems can be solved by backing up the skilled professional salesman with technical advisory services, but there appear to be many situations where it would be more economical and effective if the person in direct contact with customers is himself a technologist. In the case of smaller firms many cannot afford the expense of two men to deal with each selling problem.

The difficulty is that many technologists are not naturally good at customer relations, and in order to help to correct this situation in selected cases, the Department of Industrial Administration of the College of Technology, in Birmingham, is launching a series of short full-time courses for technical representatives. The courses, which cost 58 guineas, have been designed with the help of a panel of senior marketing and purchasing executives in the Midlands. They will be of six weeks duration and comprise organized studies of those aspects of a company's activities which must be understood by the technical representative in the field; these aspects include product development, production control and accounting.

More than half of each course will be devoted to case study and project work and interrogation meetings with people having a variety of experience in customer relations. A background to the personal work of a sales representative will be provided by a study of human relations and communication. Distribution will be examined through a study of the economic environment of trade, market intelligence, marketing and external relations. Some field work will also be done by personal attachment to experienced technical representatives and to members of purchasing departments of Birmingham firms which have agreed to collaborate with the College in this venture.

All the places in the first of these new courses, which will commence on February 16, 1959, have already been taken by companies which have been involved in the preliminary discussions, but information about future courses may be obtained from the Department of Industrial Administration, College of Technology, Gosta Green, Birmingham, 4. (Mr. W. J. Williams, B.A., senior lecturer in the economic aspects of industrial administration, is responsible for the direction of this special scheme of study.)

ISI Translations

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4 Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

1045 KOERFER, E., *et al.*: Effect of Heat-treatment on the Machinability by turning and drilling of Plain Carbon Steel containing about 0.45 per cent. C with Special Regard to the Steel-melting Method Used. *Stahl u. Eisen*, 1956, Feb. 9, pp. 125-133. (£5) (Abstracted in JISI, 1956, Dec., p. 478.)

1069 SCHLEICHER, W., and K. BOLEG: New Oil-firing System for Open-hearth Furnaces. *Stahl u. Eisen*, 1958, Aug 7, pp. 1108-1109. (£2.)

1075 NAGAMI, K., *et al.*: On the Distribution of Oxygen in Molten Steel during Refining. *Sumi. Met.*, 1958, Jan., pp. 1-4. (£1 5s.)

651 SCHULL, W. and G. ROCHROHR: Basic Hot-blast Cupola as a Pre-melting Unit in the Open-hearth Steelworks. *Stahl u. Eisen*, 1956, Jan. 12, pp. 1-13. (£6.)

685 PATTERSON, W. and A. F. OBERHOFER: Investigation of the Refractory Lining, Blast-feed and Size of Steelworks Hot-blast Cupolas. *Giesserei*, 1957, Apr. 25, pp. 227-237. (£5 5s.)

727 OBERHOFER, A. F.: Hot-blast Cupola Furnace in Open-hearth Practice. *Stahl u. Eisen*, 1957, May 16, pp. 643-651. (£4 15s.)

901 RICHTER, A., *et al.*: The (Basic) Hot-blast Cupola, Open-hearth Plant and L. D. Converter, used as an Integrated Unit. *Stahl u. Eisen*, 1958. March 6, pp. 273-284. (£8 10s.)

902 VOIGT, H.: Basic Hot-blast Cupola Furnace in the Integrated Steelworks. *Stahl u. Eisen*, 1958, March 6 pp. 284-291. (£5 15s.)

Translations in course of preparation include:

1081 LEVELINK, H. G.: Characteristics Properties of Water Glass as a Binding Agent for Moulding a Sand-core. *Metalen*, 1957, Oct. 31, pp. 406-412; Nov. 15, pp. 442-444.

1083 RYZHKOV, P. YA., *et al.*: Properties of Oxygen-blown Converter Steel. *Stal*, 1958, (7), pp. 643-647.

1084 JACQUET, P. A.: Rapid Method of Preparation of Surfaces for Metallographical Examination by Local Electrolytic Polishing. ONERA, Note Technique No. 40, 1957.

1086 HARJES, W.: Temperature Stability of Various Basic Refractories. *Radex Rund.*, 1957, (2), pp. 501-507.

SHNEEROV, YA. A., *et al.*: Preliminary Treatment of Hot Metal in Ladles with a Steam-oxygen Mixture.* *Metallurg*, 1958, (8), pp. 11-14.

SUNIN, K. P., and A. A. BARANOV: On the Solution of Graphite in Austenite.* *Metallov. Obra. Met.*, 1958, July, p. 15. ($4.25.)

If any reader knows that translations of any of the papers in the last list have already been translated, it would be appreciated if he would inform the Editor of this JOURNAL.

* Translation in preparation by H. Brutcher, Technical Translations, P.O. Box 157, Altadena, Calif., U.S.A. Enquiries should be addressed to him, *not* the ISI.

LAST WEEK a modern test-house complete with the latest equipment went into operation at Clay Cross Iron Works. At a formal opening ceremony, Col. H. H. Jackson, joint managing director of Clay Cross (Iron Foundries), Limited, said that with this addition the firm could step up production. It would be possible to make castings from a few pounds in weight up to 10 tons, and pipes from 2- to 84-in. dia. Previous top limits were five tons and 48 in. Col. Jackson was hopeful about the future of trade, despite recent set-backs.

BSA oppose Steel Renationalization

"Gravely detrimental" to the interests of stockholders, employees, customers, and to the nationally important exports of the steel industry, is how the directors of the Birmingham Small Arms Company, Limited, regard the threat of renationalization of the steel industry. They intend to do everything in their power to oppose it by every legitimate means.

In his annual report, the chairman, Mr. J. Y. Sangster, states that the issue is one of paramount importance to the company. Should it ever be allowed to come about, it would result in the loss to the BSA group of the substantial assets invested in the steel industry, an important part of its total assets and earning capacity. "State ownership would mean a monopoly in which individuality, initiative, and freedom would cease to exist, and if other experiments in nationalization are a criterion, then the State, instead of receiving revenue from taxes on companies' profits, would be compelled to subsidize losses out of increased taxes imposed on every individual in this country."

Although the short-term prospects were viewed less favourably than they were a year ago, the longer-term prospects were viewed with confidence, he states. Work on the £1,500,000 Sheffield steel development project was proceeding according to plan and new equipment was being installed. This equipment would make it possible to develop increased outputs as soon as the market recovered.

The group net balance is £1,081,726 (£1,606,966), with the inclusion of £25,000 (£187,000) unrequired tax. The dividend is increased 1 per cent. to 11 per cent.

Leyland's in India

Mr. Walter West, deputy managing director of Leyland Motors, Limited, will shortly leave England on a 12 weeks' business tour of India, Ceylon, New Zealand and Australia. He will be accompanied by Mr. F. Grimshaw, the company's general works engineer. Both are scheduled to leave London Airport on December 7.

The objective of Mr. West's Indian tour is two-fold. First he will examine India's present productive capacity of automobile castings in iron and aluminium, primarily as regards quality, but also in relation to quantity and costs. This survey may indicate the possibility of establishing foundry facilities in India for castings such as are required for the Leyland range of vehicles now in phased production at Ashok Leyland, Limited, Madras. Such production could well be expanded to serve a much wider field covered by various engineering activities in that country. In Mr. West's own words, the part of this tour relating to the provision of foundry capacity is "of an exploratory nature" and is coupled with the provision of a drop stamping and forging plant to produce forgings and stampings in carbon and alloy steels. The second objective of the Indian tour, is to examine the possibilities of expanding the use in that country of Scammell heavy-duty commercial vehicles.

Mr. West's visit to Australia will coincide with the official inauguration of Leyland's new factory at West Footscray, Melbourne, which will handle assembly of the group's vehicles, and will also manufacture an increasing proportion of component parts. It is, however, a possible development for the Melbourne plant to produce vehicles entirely designed for Australian conditions.

Hot-dip Galvanizing of Cast Iron

*By Morgan. H. Davies**

After first describing the general principles of galvanizing, the extent to which it is applied, and the types of materials treated by the process, the Author deals with the two main methods used for cast iron, both grey and malleable. There is emphasis on the necessity for good casting surface-finish and superlative cleaning in the initial stages. The report continues with notes on special problems encountered; the effect of composition, and with a brief specification of desirable attributes of castings destined for galvanizing.

Hot-dip galvanizing is a process by which a protective coating of zinc is applied to iron or steel. It differs from other zinc-coating processes in that the article to be coated is immersed in a bath of molten zinc at about 450 deg. C., resulting in the formation of a particularly tough, adherent coating, which is bonded to the basis metal by iron/zinc alloy layers. The versatility of the process and the properties of the coating have resulted in the widespread application of hot-dip galvanizing for the protection of iron and steel from atmospheric, marine and other types of corrosion, for more than a century.

General

Zinc is a plentiful, cheap metal, and it has properties which make it particularly suitable for application to steel as an anti-corrosive coating. Hot-dip galvanizing is the most widely used method of applying zinc, and the effectiveness of the protection, coupled with its comparatively low cost, have given rise to the renewed interest in, and growing popularity of, the process. Like all metals, except the most noble, zinc corrodes in atmospheric conditions. However, it corrodes much more slowly than does iron or steel, and, unlike most other metals, it is anodic to iron or steel in most environments, so that where the metal beneath the zinc may be exposed by local damage, it is still protected by the sacrificial action of the zinc.

The galvanizing industry is the servant of all other industries in which iron and steel is used and, in 1957, over 100,000 tons of zinc were used in galvanizing. Much of this was devoted to the galvanizing of sheet, tube and wire, but about 35,000 tons were used in the general galvanizing industry to process articles ranging from small nuts and bolts to 50 ft. girders. The galvanizing of castings forms a small, but important, section and there are two main types which are commonly galvanized, grey and malleable cast-iron (Fig. 1). A number of galvanizing problems are peculiar to one or both these types of basis material, and it is the purpose of this article to describe these problems and to indicate how they may be overcome.

* The Author is senior technical officer, Zinc Development Association, London.

Conventional Process

The essential features of the galvanizing process are the same whatever the material or article to be coated. These are, first, the preparation of a surface which will accept the zinc readily, and secondly the deposition of the molten zinc on to this clean surface. The standard methods of surface preparation are acid pickling and ammonium-chloride fluxing; in certain cases more stringent measures may have to be taken, but in general galvanizing, the work is usually in such a condition that a hydrochloric-acid dip will clean it sufficiently.

The purpose of the fluxing process is to facilitate the reaction between the zinc and basis metal in the galvanizing pot, by ensuring that the iron or steel surface is free from all extraneous matter when it comes into contact with the zinc. Two methods of galvanizing are commonly used, conventionally known as the "dry" and "wet" processes—names which describe the fluxing procedures. For the dry process, a separate flux-bath is needed, the work being immersed in this after pickling and rinsing. The flux layer is then dried on to the surface before immersion in the zinc bath. The wet process employs a blanket of flux on the top of the zinc bath; the article to be galvanized is brought from the pickle tanks, rinsed, dried and then lowered through the flux into the zinc. On removal from the galvanizing bath, the articles are quenched in water which removes adherent flux. Because of the strong cleansing action of the flux blanket, badly galvanized patches, due to incomplete cleaning, are less likely to occur than in the dry process, and for this reason this method is usually used for galvanizing cast iron. The nature of a cast surface is usually such that some small surface irregularities are inevitable.

The nature and thickness of the coating deposited on the clean iron or steel depend on four main factors: the composition of the iron or steel, the temperature of the bath, the time of immersion and the rate of withdrawal. A considerable amount of research work has been devoted to investigating the effects of changes in these variables, and an understanding of the galvanizing process has been markedly advanced as a result.

FIG. 1.—*Representative selection of galvanized malleable-iron castings.*

Cast Iron—Special Problems

In theory, the galvanizing of castings follows the normal process, but certain practical difficulties are encountered. These have been shown to be due mainly to poor casting-surfaces and particularly to the presence of patches of burnt-on sand. Long immersion times are often used in an attempt to produce satisfactory coatings, but these result in heavy uneven coatings and heavy formation of "dross" or "hard zinc," a pasty reaction-product of iron and zinc which collects at the bottom of the galvanizing bath. It has now been demonstrated that more meticulous preparatory treatment eliminates the need for long immersion times, and if the castings are shotblasted, continuous uniform coatings can be produced in normal galvanizing times. Unfortunately the shotblasting process is more expensive than pickling; but against this must be set the wastage of zinc in excessively thick and uneven coatings and large quantities of dross, and the lower productivity resulting from longer immersion times. If the size and section of the casting allows it to be tumbled in a machine like the Wheelabrator, even the dirtiest surface can be cleaned by 16-gauge shot in a very short time. Many grey-iron castings, however, are of such thin section that they certainly cannot be tumbled, and table shotblasting may be too mild to be really effective; in such circumstances, a compromise must be reached between the preparatory treatment that is desirable and that which is just adequate—a very mild shotblasting or wire brushing, followed by acid pickling—has to suffice. An alternative method for removing adherent sand is that of hydrofluoric-acid pickling; this, though effective, is not to be recommended, for the acid causes severe burns and sores if it comes into contact with the human skin, and rigorous safety measures must be introduced to guard against this.

Importance of Casting Skin

From what has been said, it will be appreciated that any steps which the foundryman can take to improve the surface finish of castings to be galvanized will be amply repaid by cheaper galvanizing and improved quality of the final product. It cannot be too strongly emphasized that it pays to use good facing sand, and to have traps in the gating system to ensure clean metal, thus giving the galvanizer a good surface on which to work. For clean grey-iron castings extensive shotblasting should be unnecessary.

With malleable-iron castings, it is imperative that all adherent sand be removed *before* annealing. If this is not done, it may be impossible for the galvanizer to remove it at a later stage. The scale resulting from the annealing operation is best removed by shotblasting, but there may well be economic arguments against investing in shotblasting equipment, particularly for the small galvanizer who handles castings only occasionally. In his case, the waste of zinc involved in giving the castings a long immersion and thus building up a coating that is considerably thicker than necessary, will be a small factor compared with the capital outlay for shotblasting equipment—outlay which limited use could never justify.

Effect of Composition and Design

As has been indicated, castings are usually galvanized by the wet process and quenched in water after galvanizing. The castings are thereby submitted to a second very rapid change of temperature which produces large thermal stresses in the material. It is vital, therefore, that both the design and the composition of the casting should take account of this; rapid changes of section should be avoided, and good-quality iron used.

It has been shown that the composition of grey cast-iron does influence the operation of the galvanizing process itself. In a paper presented to the Fourth International Galvanizing Conference in 1956, Hiscock[1] described experiments to investigate the effects of different proportions of silicon and phosphorus in grey-iron castings. His work showed that, when galvanizing and using a comparatively short immersion time, of the order of 2½ min., variations of silicon content from 0.1 to 1 per cent. have effects which, although measurable, are not of practical importance. When, however, a dipping time of 15 min. is used (*i.e.* if shotblasting has not been carried out) the variation of dross formation and zinc pick-up with silicon and phosphorus content of the iron are most marked; both increase as

the silicon content of the iron decreases, very-low-silicon irons having at times a zinc pick-up of as much as 10 oz. per sq. ft. of surface. The wastage of zinc in such cases is obviously a serious one, so that if shotblasting is not to be used, the composition of the cast iron becomes a significant factor.

Conclusion

The ideal casting from the galvanizer's point of view is one on which no adherent sand remains. Founders are becoming increasingly aware of their responsibility in this matter and many are shot-blasting their castings before they are sent to the galvanizer; this enables a uniform coating to be applied using short immersion times and conventional acid pickling. Failing this, since shotblasting is an expensive process beyond the resources of many small galvanizers, it might be possible for ironfounders to provide grey-iron castings of a composition more suited to the galvanizing process, where the application makes this possible. The best coatings and least dross formation are produced when iron of high-silicon (3 to 4 per cent.), and high-phosphorus (1 per cent.), content is used, and the wastage associated with long immersion times is in these circumstances reduced to a minimum. By close co-operation between founder and galvanizer, the problems connected with the galvanizing of castings can readily be resolved.

REFERENCE

[1] Hiscock, S. A. *Proc.* Fourth International Galv. Conf. (Milan) Z.D.A. London, 1957.

Alternative Methods of Pattern Construction

By "Chip"

Most castings can be made in a variety of ways, but there is usually one method that is best, and for repetition work should be adopted as standard practice. Occasionally, there comes into a foundry a job somewhat out of the ordinary line of production, and it is a wise patternmaker who consults the moulder before commencing the patternwork, as invariably, after a pattern is constructed, the moulder affirms that had it been constructed differently he could have made the casting cheaper and better.

Such a case is illustrated in Fig. 1 (*a*), which shows a very simple casting of which 12 were required. Without consulting the moulder the patternmaker proceeded to make the pattern to mould as Fig. 1 (*b*), which necessitated a deep stepped joint. He also constructed the pattern from three pieces of timber which were held together by a glued groove and tongue joint as Fig. 1 (*c*). To stiffen the pattern and ensure that it stood up to the usage of the foundry two ribs were added. These were to be subsequently filled in by the moulder. The complete pattern was as Fig. 1 (*d*).

A better way would have been to have built the pattern by means of laminated segments as Fig. 1 (*e*). Such a pattern would obviate the necessity for strengthening ribs and thus save the time taken stripping them off in the mould. Such a construction would also allow of the pattern being moulded as Fig. 1 (*f*), which would eliminate the deep joint which was necessary in the other method.

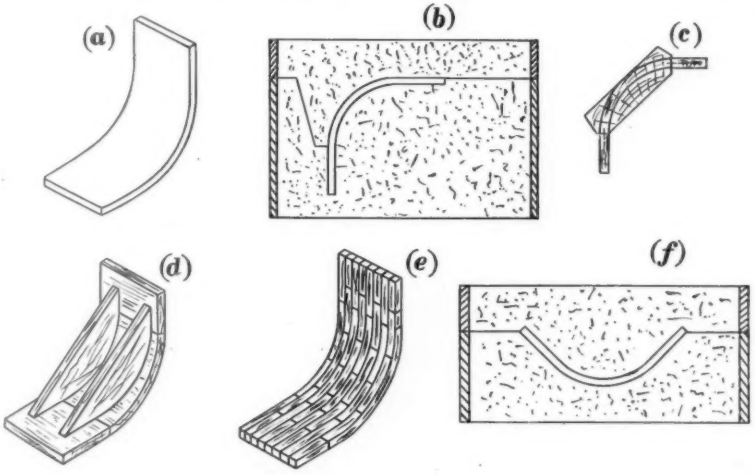


FIG. 1.—*Various ways, good and bad, of making a pattern for a simple casting* (*which is shown at* (*a*)).

SCHOLARSHIPS enabling undergraduates at British universities to change from arts to science subjects are to be granted for at least a further two years by Imperial Chemical Industries, Limited. Under the ICI scheme, which was started in 1956, a total of 65 scholarships is available at eight universities.

THE NATIONAL STEEL FOUNDRY (1914), LIMITED, Leven (Fifeshire), where between 50 and 60 men were paid off when the works went on a four-day week early in October, has returned to the normal five-day working. Just over 600 men are employed at the foundry.

North Lindsey Technical College Foundry

This article is an interesting description of the problems encountered, and overcome, during the introduction of a foundry course into the curriculum of a new technical college.

The first part to be completed of the North Lindsey Technical College, which was brought into use in September, 1953, and officially opened in May, 1954, included a well-equipped foundry, with a floor area of 1,160 sq. ft. It is provided with a 12-in.-bore cupola, and a gas-fired crucible furnace (Fig. 1). Other facilities include a core oven; sand mills; moulding machines and benches, and provision for sand testing. Electric and compressed-air power are available for portable tools. The foundry was provided by the education committee on the recommendation of the engineering advisory committee, with the approval of the College board of governors.

"Teething" Troubles

Efforts were made in each of two successive years to establish classes in foundry practice which would lead to City and Guilds of London Institute examinations, but on each occasion attendances fell off to such an extent that it was necessary to close the classes before the end of the session. A meeting was therefore held to which employers, representatives of foundry trades unions, and others interested, were invited. After a very thorough discussion of the reasons for the failure of the previous classes, and of what efforts were necessary to achieve success, a foundry working party was established under the chairmanship of Mr. J. L. Gaskell, B.SC.(ENG.), M.I.E.E., who is also chairman of the College engineering advisory committee.

The working party, at its first meeting, recommended that classes should be provided for a single stage only, that the course should be as practical as possible, and should contain only such science, calculations and drawing as was within the capabilities of the students to assimilate. The main aim of the course should be to gain and to maintain the interest of the students. For the time being the objective of future examinations was to be removed. All the firms represented agreed to grant apprentices one day per week release to attend classes, and to provide, in rotation, a teacher for the subjects of foundry practice, and foundry technology. New syllabuses were prepared by the College teaching staff and approved by the working party. Works visits for the students were to be arranged to take place immediately before and during the College session.

By the Christmas holidays of the first session it was obvious that the main ambition of the working party, namely, to gain the interests of the students, had been achieved, especially when students were allowed to cast for themselves small decorative domestic articles. Students continued to attend regularly not only in the new year but until the end of the session. The College was therefore able to prepare with confidence for a second stage to be provided in the following session.

Cupola Furnace

The first session of this new scheme had opened with the College still not in possession of a suitable cupola furnace, and in fact no very clear ideas where such a cupola was to be obtained. As late as the end of November that year the principal and head of the Engineering Department visited the foundry training school at the works of Newton Chambers & Company, Limited, of Thorncliffe, and saw there a cupola eminently suited to technical college requirements. The Company agreed to manufacture in its works school a similar cupola for the North Lindsey Technical College, the work to be carried out entirely by apprentices.

By the following Easter the cupola had not only been delivered to the College but also completely assembled by apprentices of Newton Chambers, who were taken to the College for that purpose.

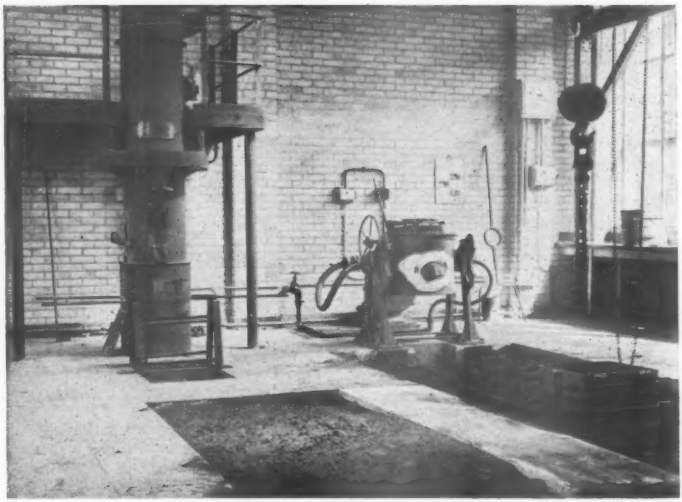


FIG. 1.—*View of the foundry at North Lindsey Technical College, showing the* 12-*in.-bore cupola (newly installed) and the gas-fired crucible furnace.*

FIG. 2.—*Mr. S. B. Rippon, of Newton Chambers & Company, Limited, making the first tap of the new cupola furnace supplied by his firm to North Lindsey Technical College.*

The cupola was then lined to give a 12-in. bore, the materials and labour for this being given by the Appleby Frodingham Steel Company and Firth Thos. & John Brown, Limited. Finally representatives of Newton Chambers came to conduct a trial melt in the cupola and to give guidance to College staff on its future operation. For supplying and installing the cupola, and for the many services involved, the Company charged the Lindsey education committee a sum which could only be regarded as nominal.

First Tap

To show the appreciation of the College governors for the assistance rendered by Newton Chambers, a ceremony was held to commemorate the first tapping of the cupola, which was made by Mr. S. B. Rippon of the company (Fig. 2). Present at the ceremony, besides Mr. Rippon, were the mayor and mayoress of Scunthorpe, the chairman (county councillor Mr. A. Wrigley), and other members of the College board of governors, including Mr. J. L. Gaskell. Also present were Mr. B. Morton, head of the Newton Chambers training school, members of the foundry working party, members of the College staff, and, last but by no means least, the firm's apprentices who had installed the cupola. From the first tapping an excellent casting of a plaque, bearing the Lindsey coat of arms, and suitable lettering for the occasion, was made. This casting was painted in the Lindsey colours and is hung permanently in the entrance to the foundry Since the cupola was installed it has been used regularly and has proved most suitable to the needs of such a College course. Its use has removed any flagging of interest in the students, and the only difficulty has been to ensure continuity in providing a teacher for the classes in foundry technology and foundry practice.

Continuity

To remove this uncertainty of the continuity of the classes, the College governors have now decided, on a recommendation of the foundry working party, to appoint a teacher of foundry subjects to the permanent full-time teaching staff of the College. A third-year course has been introduced, and from this it is hoped that some students will obtain the City and Guilds of London Institute intermediate certificate in foundry practice, in the summer of 1959.

Although the numbers in the various stages of the course are never expected to be large, since there is not a large number of foundries in North Lincolnshire, nevertheless it is believed the course will contribute substantially to at least the maintenance, if not expansion, of the foundry industry in this part of the country. The action of the Lindsey education committee in providing the foundry and the course, the endeavours of the foundry working party and the College staff, the interest of the local founding firms, and the goodwill of Newton Chambers and Company, Limited, are all felt to have been fully justified by the progress which has been made.

* * * * *

On June 27 last the College was honoured by a visit from Her Majesty Queen Elizabeth II and His Royal Highness the Prince Philip, Duke of Edinburgh. Both the Queen and the Duke showed much interest in the foundry students and in their work. The students were thrilled to be spoken to by the Royal visitors and will undoubtedly cherish the memory of the occasion for the rest of their lives.

Machine-tool Orders from China

Machine-tool orders worth over £1,100,000 have been ordered by the China National Machinery Import Corporation from the Asquith Machine Tool Corporation, Limited, and David Brown Machine Tools, Limited. These are the first large machine-tool orders China has placed in the UK since the relaxation of the strategic embargo in August.

The Asquith order, which is worth over £600,000, includes some of the largest horizontal milling and boring machines in the world. The bulk of the machines will be delivered during 1959. David Brown is to supply turbine gear hobbing machines which, together with the measuring instruments and gear-cutting tools, are worth £500,000. Deliveries are to start next November.

Company News

ATLAS STEEL FOUNDRY & ENGINEERING COMPANY, LIMITED—A final dividend of 1s. 1d. (1s. 5d.) per 5s. unit, making 2s. 1d. (same) per unit for the year ended September 30, 1958, is being paid, together with a special interim of 8d. (nil) per unit for 1958-59. Subject to audit, net profit amounts to £175,066 (£70,896) after depreciation of £20,000 (£50,000) and tax of £151,000 (£108,200).

BUTTERLEY COMPANY, LIMITED, bridge builders, structural and general engineers, etc., of Derby—The company announces a capital distribution for 1958, in lieu of an interim dividend, of 4d. per 2s. 6d. share, not subject to tax, payable on December 6. Similar payments were made for each of the three preceding years, followed by further distributions of 8d. per share, making 1s., not subject to tax, for each year.

H. W. KEARNS & COMPANY, LIMITED, makers of machine tools, horizontal boring machines, etc., of Altrincham (Ches)—The total dividend is being raised to 20 (17½) per cent. with a final of 15 (12½) per cent. A capitalization issue on a three-for-five basis is proposed and the board expects that it will be able to recommend dividends in respect of the current year totalling not less than 14 per cent. on the increased capital. Net profits were £125,610 (£115,570), after tax of £131,527 (£117,908).

PETER BROTHERHOOD, LIMITED, engineers and ironfounders, of Peterborough—Mr. A. Marcus Neal, chairman, announced a one-for-two scrip issue at last week's meeting in London. Shareholders, he said, would be invited to meet again early in the New Year to increase the authorized capital and to sanction the capitalization of reserves. There was every indication, said Mr. Neal, that both turnover and profits for the year ending March, 1959, would be satisfactory and comparable with the averages for the past few years.

HARLAND & WOLFF, LIMITED—At last week's extraordinary meeting at Belfast, the proposal to alter the articles so as to make it impossible for control of the company to fall into foreign hands at any time, was passed by 1,837,298 votes to 534,186. Sir Frederick Rebbeck, chairman, pointed out that the company's interests—shipbuilding and marine engineering—were the largest in the UK, and it would be neither in the national interest, nor in the interest of stockholders, for control to pass out of the hands of British nationals.

J. BROCKHOUSE & COMPANY, LIMITED, dropforgers, ironfounders, etc., of West Bromwich—The lower general level of outstanding orders during the last nine months indicates shorter delivery periods rather than a falling off in total business executed, says the chairman, Mr. John L. Brockhouse. Since the beginning of September the order intake has increased. It remains to be seen, he adds, how far economies and increased production can be made to offset rising expenses. Group net profit for the year to September 30, 1958, was £365,105 (£391,058 for the previous year) and the 8½ per cent. dividend was repeated.

French Iron and Steel Industry

Total steel output in France rose from 10,630,000 tons (10,800,000 *tonnes*) in 1952 to over 13,800,000 tons (14,000,000 *tonnes*) in 1957, according to F. Colombey, *Revue de l'Industrie Minerale*, September, 1958. A capacity of 18,700,000 tons (19,000,000 *tonnes*) is forecast for 1961, because, in spite of the current increase, the percentage within ECSC is on the decline. The increase will have to be accomplished by the development of pig-iron production, as scrap resources are limited.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

799,798. Enn Vallak, 19, Avenue Beau Sejour, Geneva, Switzerland.

A hot-top for casting mould. (See also B.P. 731,324, JOURNAL, July 21, 1955, and 753,789, October 4, 1956.)

This new hot-top could consist of about 25 per cent. by weight of sawdust, about 10 per cent. by weight of sulphite waste lye and about 65 per cent. by weight of dolomite. These hot-top plates or elements are moulded of this mixture in such a way that the walls of the hot-top become combustible and simultaneously porous or gas permeable.

799,942. H. J. Daussan, 9, Av. Leclerc de Hauteclocque, Metz (Moselle), France.

Casting in ingot moulds or similar metals or alloys, and more particularly ferrous metals, such as "killed" steels or steels with little effervescence, by the top or bottom casting technique. After the metal has been poured it is allowed to cool for a short period so that it forms in the usual way a surface crust. Heat is then applied along the entire periphery of the crust without causing crystallization, segregation, recarburization, or fixation of oxides in the hollows, as is often the case when dead-heads are used.

800,083. American Smelting and Refining Company, 20, Broadway, New York, 5, NY, USA.

Pouring mechanism as for casting molten metal. The invention relates more particularly to a pouring mechanism provided with an improved stopcock means for casting, especially those metals of relatively low-melting point such as lead.

800,087. National Lead Company, 111, Broadway, New York, NY, USA.

Apparatus for carrying out, simultaneously, casting and trimming operations in pressure-die-casting.

800,143. Rolls-Royce, Limited, Nightingale Road, Derby.

Improvements in the preparation of moulds and cores for use in metal-casting processes, especially in precision casting. (See also B.P. 770,527, JOURNAL, May 9, 1957.) The mould is made from a refractory moistened with an aqueous solution of sodium or potassium silicate and hardened by the action of CO_2. Acid-hydrolyzed ethyl silicate, dissolved in an inflammable solvent is then applied. The solvent is then burned off, to strengthen the refractory structure.

800,228. Howard Foundry Company, 1,700, Nth. Kostner Avenue, Chicago, Ill., USA.

Formation of cored passageways in metal castings. The process is directly concerned with overcoming the difficulties normally present in the formation of small-bore passageways having one or more curves. An important innovation of the invention is the provision and use of a flexible gas-permeable refractory sleeve as the primary member of a core element.

800,321. Babcock and Wilcox Company, 161, East 42nd Street, New York, 17, NY, USA.

Ingot casting with particular reference to the continuous casting of ferrous-metal ingots.

A/S BJOLVEFOSSEN, at Alvik, have installed three new ferro-chrome furnaces which will raise their smelting capacity by 50 per cent. to 15,000 tons annually.

W. H. Allen, Sons & Company to supply Plant for New Liners

Two contracts for generating plant to be used in two new liners being built by Vickers-Armstrongs (Shipbuilders), Limited, have been placed with W. H. Allen, Sons & Company, Limited, Bedford. The first order is for the entire generating plant, comprising four 1,750-kw. pass-out condensing turbo-generators and two 200-kw. diesel engine-driven emergency generators, for the new 40,000-ton Orient liner, Oriana. The company is also to supply the liner with most of the electrical equipment for the engine-room auxiliaries and the electrical equipment for the manœuvring controls.

The second contract involves the supply of the entire generating plant, with the electrical equipment for the stabilizing gear and other engine-room auxiliaries, for the new 27,500-ton liner being built for Canadian Pacific Steamships, Limited.

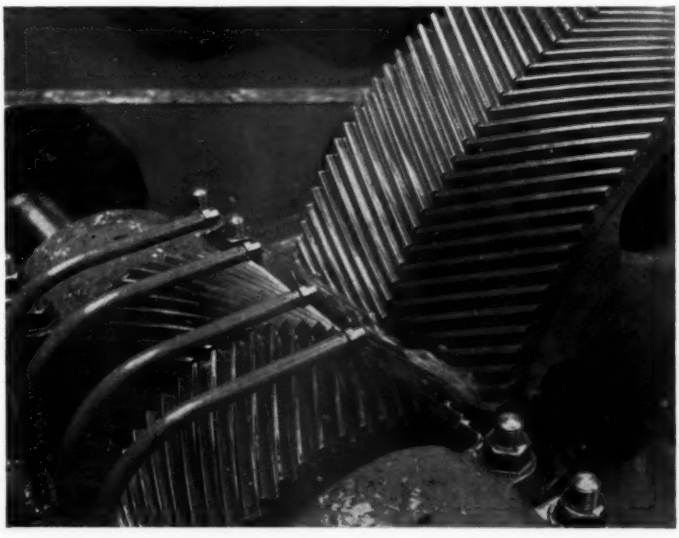
New Clean Air Regulations for Scotland

New regulations laid before Parliament last week by the Secretary for Scotland, Mr. John Maclay, bringing into force those provisions of the Clean Air Act not already in operation in Scotland, make it an offence to emit dark smoke from industrial chimneys, railway engines, or ships.

That section of the act allowing local authorities to set up smoke-control areas is already in operation. Under it householders must burn smokeless fuel and factory chimneys are allowed to emit smoke for short periods—normally not more than 10 minutes in any eight hours. Continuous emission of dark smoke in any one period must not usually exceed four minutes.

Film Review

Introduction to Modern Gears. A new 30-min. film by Shell-Mex and B.P., Limited, satisfies the need for a film on gear manufacture. The film was planned as a training aid for schools, technical institutes, and individual industries with their own apprentice training schemes. After a brief recapitulation of the functions of gears the film illustrates the division of gears into those with parallel or intersecting shafts and the others. A special rig demonstrated how gears, with involute teeth, could be generated from a straight-sided rack. The film demonstrates the production of many types of gears and illustrates their uses. Photo-elastic techniques and the use of a wide-range magnetic tape were exemplified in the respective study of visual stresses inside gear teeth and gear vibrations under load.



Spray lubrication of cast double-helical gears—a "still" from the film produced by Shell-Mex and B.P. Limited.

Technical Co-operation on Nuclear Power for Japan

Conclusion of a contract with the General Electric Company, Limited, for technical co-operation on nuclear power generation was announced recently by the Fuji Electric Company of Japan. The contract is subject to the approval of the Japanese Government.

Fuji Electric stated that the contract had been concluded in expectation of an order from the Japanese Atomic Power Generating Company to the GEC atomic energy group, as well as for a more general purpose of acquiring overall technical knowledge on atomic power generation. It was also stated that the company is to pay a licence fee of between £140,000 and £180,000 and royalties of 4 per cent. to GEC and about 3 per cent. to the UK Atomic Energy Authority.

Fuji Electric is the largest of 14 firms comprising the First Atomic Power Industrial Group (FAPIG) with which the General Electric Company-Simon-Carves atomic energy group has reached an agreement. Three of the British nuclear energy industrial groups are seeking a contract for a Calder Hall-type power station for Japan and a "letter of intent" is expected to be placed before the end of the year.

Latest Foundry Statistics

Light Alloys. The Ministry of Supply announces that the production of aluminium castings during August was 1,239 tons from sand moulds; 2,795 tons as gravity-die and 1,154 tons as pressure die-castings. The output of magnesium-alloy castings was 105 tons.

Copper-base Alloys: The monthly report from the British Bureau of Non-Ferrous Metal Statistics shows that the production of copper-base castings for the first nine months of this year (54,264 tons) was approx. 3,000 tons lower than the similar period of 1957. The output during September was 6,446 tons, which shows an improvement on the monthly average for this year.

British Blast Furnaces in the September Quarter, 1958

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the third quarter, 1958.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Clay Cross Co. (Iron & Foundries)	—	—	—	—	—	0.6	1
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	2	—	2	2.1	4
Kettering Iron & Coal	—	—	1	—	1	1	2
Renishaw Iron	—	—	2	—	2	2	2
Sheepbridge	—	1	1	—	2	2	2
Stanton Ironworks: Stanton-by-Dale	—	—	4	—	4	3.5	5
Staveley Iron & Chemical	—	—	3	—	3	3	4
Stewarts and Lloyds: Corby	—	3	—	—	3	3	4
Wellingboro' Iron	—	1	—	—	1	1	3
TOTAL	—	5	14	—	19	19.2	28

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel Works	—	1	—	—	1	1	1
Darwen & Mostyn Iron	—	—	—	1	1	1	2
Lancashire Steel Manufacturing	—	2	—	1	3	3	3
Summers, John	—	2	—	—	2	2	2
TOTAL	—	5	—	2	7	7	8

North-West Coast.

Barrows Ironworks	2	—	—	—	2	1.7	4
Charcoal Iron	—	—	—	—	—	—	1
Millom Hematite Ore & Iron	2	—	—	—	2	2	2
United Steel: Workington	2	—	—	—	2	2	3
TOTAL	6	—	—	—	6	5.7	10

Lincolnshire.

Appleby-Frodingham Steel	—	3	—	—	3	3.1	4
Lysaght's Scunthorpe Works	—	3	—	—	3	3	3
Thomas, R., & Baldwins: Redbourn	—	3	—	—	3	3	3
TOTAL	—	9	—	—	9	9.1	10

North-East Coast.

Consett Iron	—	2	—	—	2	1.7	3
Dorman Long (Steel): Acklam	—	2	—	—	2	2	4
Redcar	—	—	—	—	—	—	2
Bessemer	—	1	—	1	2	2	3
Clay Lane	—	2	—	—	2	2	2
Gjers, Mills	2	—	—	—	2	2	3
Normanby Iron Works	2	—	—	—	2	2	3
Skinningrove Iron	—	2	—	—	2	2	3
South Durham Steel & Iron:							
West Hartlepool	—	2	—	—	2	2	2
Cargo Fleet	—	2	—	—	2	2	3
TOTAL	4	13	—	1	18	17.7	28

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	1	—	3	3	3
Carron	—	—	1	—	1	1	4
Colvilles: Clyde Works	—	2	—	—	2	2	3
Ravenscraig	—	1	—	—	1	1	1
Dixon's Ironworks	—	—	—	—	—	—	6
TOTAL	1	4	2	—	7	7	17

South Wales and Monmouthshire.

Briton Ferry Works	1	—	—	—	1	1	1
Guest Keen Iron & Steel: Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins: Ebbw Vale	—	3	—	—	3	2.9	3
Steel Company of Wales: Margam	—	4	—	—	4	4	4
TOTAL	2	9	—	—	11	10.9	12

BISRA Conference

The plant engineering and energy division of the British Iron and Steel Research Association is organizing a conference, on the general theme of "Iron and Steel Works Buildings," at Ashorne Hill, near Leamington Spa, from January 13 to 15, 1959, under the directorship of Mr. R. L. Willott, D.S.O., O.B.E., chief mechanical engineer, John Summers & Sons, Limited.

Among the ten papers to be presented will be several covering British constructional steelworks practice; others will be contributed by French and German designers working in this field. Aspects of civil and structural engineering which influence capital and maintenance costs and facilities for improving output, will be given detailed consideration at the conference. The final paper on the architectural aspects of steelworks buildings will be given by Mr. F. Gibberd, C.B.E., who will also summarize the proceedings.

Further details of the conference may be obtained from the technical secretary of the division, at 140, Battersea Park Road, London, S.W.11.

Mr. WILLIAM JAMES CLEVERLY has been appointed sales manager of the bonded abrasives division of the Carborundum Company, Limited. Aged 36, Mr. Cleverly joined the company in 1939. In 1948, he was appointed sales representative in Lancashire, and was transferred to London in 1952.

Hadfield Centenary

To commemorate the centenary of the birth of Sir Robert Hadfield, the inventor of manganese and other steels, an exhibition is being held at the Sheffield Central Library, Surrey Street, and will remain open until the latter end of January, 1959.

Exhibits include Robert Hadfield's diary recording his visit, as a youth of 19, to the Paris Exhibition on June 4, 1878, where he saw the Terre Noire Company's exhibits of ferro-manganese, and a pamphlet which showed the influence of different bodies alloyed with iron. It was this that led him to his own experiments and the discovery of manganese-steel at the early age of 24.

Also on show are his notebooks and the facsimile on his report on the experiment of September 7, 1882, which resulted in the development of manganese-steel, and his first patent for the "invention of improvements in the manufacture of steel," January 12, 1883. The results of experiments at Hadfield's Steel Foundry Company in 1891-2 to reduce working hours, can be seen in time-tables from "A Shorter Working Day," by R. A. Hadfield and H. de B. Gibbins.

Photographs show the first Fitzalan Square tramline layout in Sheffield—produced in manganese-steel in September, 1901—and one of the model homes built in Don Street by Hadfield for his workpeople. The renowned silicon-steel experiments are covered in the display; there is also his 1899 paper on "Alloys of Iron and Nickel" for which he received the George Stephenson Gold Medal, and the report of the presentation to him of the Bessemer Medal in 1904.

Another Hadfield Centenary Exhibition was held from November 28 to 29, at the Attercliffe Community Centre, near the house where Sir Robert Hadfield was born. The exhibition reflected the social conditions of his day. Lord Dudley Gordon, chairman of Hadfields, Limited, performed the opening ceremony, and others present included the Lord Mayor of Sheffield, Alderman J. W. Holland; the Master Cutler, Mr. J. H. Neill, and Mr. John Hynd, M.P.

THE FACTORY EQUIPMENT EXHIBITION, including heating, ventilation and insulation, is to be held at Earls Court, London, from April 7-17, 1959, and enquiries regarding the exhibition should be sent to the organizer, Factory Equipment Exhibition, 4 Snow Hill, London, E.C.1.

British Blast Furnaces in the September Quarter, 1958—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of third quarter, 1958.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Lilleshall Iron & Steel	—	—	1	—	1	1	2
Shelton Iron & Steel	—	2	—	—	2	2	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	3	2	—	5	5	9
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	13	50	18	3	84	83.6	124

Weekly Average Number of Furnaces in Blast during the September Quarter, 1958, and the Previous Four Quarters

District.	1957.		1958.		
	Sept.	Dec.	March.	June.	Sept.
Derby, Leics., Notts., Northants, and Essex	24.5	22.6	22.2	21	19.2
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Ches.	6	6.6	7	6.4	7
Lincolnshire	9.7	10	9.7	9.6	9.1
North-East Coast	20	20.5	21	19.2	17.7
Scotland	9.7	9.9	8.8	8.9	7
Staffs., Shrops., Worcs., and Warwicks.	7	6.2	5.4	5	5
South Wales and Monmouth	11	11	11	10.9	10.9
Sheffield	1	1.9	2	2	2
North-West Coast	8.8	8.8	8	7.8	5.7
TOTAL	97.7	97.5	95.1	90.8	83.6

The following companies have furnaces in course of construction or rebuilding:—Lancashire Steel Manufacturing; Millom Hematite Ore & Iron; South Durham Steel & Iron (West Hartlepool); Steel Company of Wales; J. Lysaght's Scunthorpe Works.

Metal Industries' Dividend

Maintenance of a 4 per cent. interim dividend, but payable two months earlier than on previous occasions, is announced by Sir Charles Westlake, chairman of Metal Industries, Limited. The results for the 28 weeks ended October 11, 1958, show a profit before taxation of £679,000, compared with £719,000 for the first 24 weeks and £811,000 for the first 28 weeks of the previous financial year. The profit for the full year was a group record at £1,755,912.

Current conditions had adversely affected certain of the companies in the metals division of the group, states Sir Charles. The first half of the year was barely affected by recent wage awards in the engineering and shipbuilding trades, but they would be reflected in the results for the remainder of the year.

The sale in June of the substantial holding in the British Oxygen Company, Limited, had had the effect of losing to the company the £60,000 interim dividend, before tax, which was passed on to stockholders. Nothing was included in the results in respect of Towler Bros. (Patents), Limited, for which the group paid £800,000 in September. It was indicated at that time that Towlers' profits were running at around £140,000 a year.

ANTI-DUST SERVICES, LIMITED, of Dudley, Worcs., have opened an office in London to serve south-east England. The office is under the control of Mr. A. A. Evans, and is at 27 Eastern Avenue, Wanstead, London, E.11.

New Catalogues

Surface Sealing of Wooden Patterns and Moulds. Bakelite, Limited, 12 to 18, Grosvenor Gardens, London, S.W.1, have published an advance information sheet, B.31, entitled "Bakelite Phenolic Resin for Surface Sealing of Wooden Patterns and Moulds." The leaflet describes how, due to the porous nature of wood, it is always necessary to seal the surface of wooden patterns and moulds before they are used in the making of castings. This imparts a smooth finish to the moulding surface and facilitates release.

Experience has shown, the leaflet says, that a cold-setting phenolic varnish provides a satisfactory sealing medium for this purpose. The varnish is based on Bakelite liquid resin R.11168 and industrial alcohol, to which has been added a small proportion of wetting agent and liquid accelerator. Full details of the procedure and two varnish formulations are also given in the leaflet.

Slotted-steel Channel. The firm of Williams & Williams, Limited, Roften Works, Hooton, Wirral, Cheshire, manufacturers of metal windows, have now entered upon the manufacture of slotted-steel channel sections. The reviewer first met these in use in research laboratories, where rigid temporary structures are much in demand. Since then, he has seen much use being made of this material for the construction of pattern storage-racks and the like. The material made by Williams & Williams is available in three sizes and four weights, supplemented by a range of accessories such as castor panels and shelves. A number of typical constructions are shown in a four-page illustrated leaflet recently issued. Cost has somewhat restricted the use of this material in the past, and maybe the new product holds out a promise of greater economy.

Mechanical Handling. Geo. W. King, Limited, Stevenage, Hertfordshire, have issued a 24-page catalogue entitled "Mechanical Handling Equipment Digest." A novel idea has been used in the front-cover page which for the first time, in the reviewer's opinion, makes a composite picture really useful. This is because a "key" to the picture is given inside which indicates the catalogue reference numbers dealing with the items illustrated. Though a digest, the catalogue is really quite a comprehensive publication. It illustrates and by captions describes actual plant installed using the firm's overhead chain conveyors; floor conveyors; overhead runways; pulley blocks; tractor units; grabs; cranes and miscellaneous services. Several foundry applications are covered.

Publications Received

Aluminium Windows. Published by the Aluminium Development Association, 33, Grosvenor Street, London, W.1; price 10s. 6d.

The choice of buildings used in this publication to stress the application of aluminium windows is commendable, as they are artistically much superior to the usual square boxes of bricks now being erected. Much technical information has been included in the booklet.

Employing the Ex-Regular. Issued by the Ministry of Labour and National Service, St. James's Square, London, S.W.1.

This is a sensible statement to employers by the Resettlement Advisory Board outlining the actions to be taken when adding ex-military men to the staff. It carries a foreword by Mr. Iain Macleod, the Minister of Labour and National Service.

House Organs

Nickel Bulletin, September/October. Issued by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

An interesting feature of this issue of the *Nickel Bulletin* is the quarterly review of recent patents. This section contains abstracts of over 50 patents, which range from uses of nickel in thermionic cathodes and cutting tools, to black-nickel plating, cladding of mild steel with titanium, and development of new brazing alloys and creep- or corrosion-resisting materials.

In addition to the patents section the *Bulletin* contains the usual review of literature relating to nickel. Current interest in high-temperature alloys is reflected in, *inter alia*, an item referring to a new alloy in the "Nimonic" series, and in others concerned with creep, thermal-shock and stress-rupture properties. In other sections attention is directed to literature on nickel-containing constructional steels, cast irons and non-ferrous alloys.

Foseco Foundry Practice, No. 132. Published by Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

It is quite interesting to read in this issue about steel castings used in connection with rocket-launching gear. The front-cover picture shows one of these castings but without any indication of its size, and one needs to turn over the page to the line drawing to realize that it weighed about a ton. The citation was concerned with the use of exothermic feeding sleeves. The reviewer was not so happy with the diagram showing how scabs occur, as he deems it to be a case where over-simplification may result in inadequate explanation.

Carron Cupola, Vol. IX, No. 4. Issued by the Carron Company, Falkirk.

This issue announces the appointment of Mr. Norman Croft as manager of the Mungal Foundry. He was educated at Mexborough Grammar School and Sheffield University and started his professional life as an assistant metallurgist at Hadfields, Limited. From there he went to Lloyds (Burton), Limited, and in 1952 joined the Carron Company (South Africa), Limited, first as works superintendent and later works manager. During this period he was a vice-president of the South African branch of the Institute of British Foundrymen.

Staveley News, Autumn, 1958. Issued by the Staveley Iron and Chemical Company, Limited, and the Sheepbridge Company, Limited, near Chesterfield.

This issue announces the promotion of Mr. E. Freer, the foundries general manager, to the board of directors, and the presentation of plaques to the continental firms which had been hosts to the company's apprentices. The plaques are intended for competition amongst the boys from these firms, and carry nameplates for a succession of winners. This magazine is outstanding for the excellent way it handles "gossip" of interest to the firm's staff.

Tin and Its Uses, No. 44. Published by the Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex.

The reviewer found "Les Etains Francais" the most interesting article in this issue, as it illustrates and describes some French historic articles made from pewter. A wide variety of topics is included in this very interesting quarterly.

PETTERS, LIMITED—Mr. J. C. Gale has been appointed to the board of the company, which is a member of the Hawker Siddeley Group, Limited.

Sign of the Times?

A sign of the times consequent upon reduced foundry activity is the increased insistence by American casting-buyers that specifications be met, and in some cases tightened up. The first four abstracts reproduced in what follows illustrate this feature, while the final report shows almost the reverse trend as applied to the production of stainless-steel and high-alloy castings, particularly as regards surface finish.

These four synopses are taken from a session ("Design and Specification for High-quality Castings"), sponsored by the American Society for Metals, which was part of the proceedings at the meeting of the Metallurgical Societies, which was held during the week beginning October 27, at Cleveland, Ohio. The session was held under the chairmanship of Mr. W. P. Dudley, Ohio Steel Foundry Company.

Aircraft and Missiles

By Mrs. R. H. Sparling, Convair-Pomona Division

Reporting upon castings for aircraft and missiles, Mrs. Sparling mentioned that such parts should measure up fully to specification test values. In this connection, integral parts of the casting subjected to tensile and other tests would be more significant than values obtained from separately-cast test bars. In the foundry industry, it was common practice to conduct thorough tests upon stress distribution by the stress analysis methods. Thorough testing was expected, including tests by fluid or pressure methods, magnetic-particle inspection, radiography, and other physical means. Mrs. Sparling stressed the importance of maintaining dimensional tolerances on castings, and fidelity to patterns. Some discussion followed on the importance of toughness values, and their interpretation as now measured by elongation or impact-test methods.

Castings for the Petroleum-refining Industry

By N. J. Rees and R. W. Manuel, Socony Mobil Oil Company, Incorporated

It was reported that the petroleum-refining industry requires pressure-resistant castings for valves, fittings, etc., of high quality, and capable of withstanding pressures ranging from a vacuum, to 5,000 lb. per sq. in., over the temperature range −29 deg. C. to 816 deg. C. Basic requirements must conform to ASTM specifications, and castings are expected to be free from cracks, hot tears, etc., and to be corrosion- and heat-resistant. Thermal stresses sometimes impose additional stress on the design load, and the defects mentioned, which may be developed in service, often tend to be overlooked during inspection. A service period of ten years is expected. The authors felt that standards should be set up for (*a*) soundness, and (*b*) minimum quality, unless covered in specifications, and that the foundryman must co-operate with the purchaser to improve products.

Railroads

By W. R. Elsey, Pennsylvania Railroad Company

Mr. Elsey commented upon the position of castings in the railroad industry, and said that steel castings were the principal product used and that purchases were governed mainly by ASTM or AAR* specifications. The metallurgical quality in general was satisfactory, but open to development. Mr. Elsey said that better control of metal composition and casting dimensional tolerances was necessary, so that this phase of inspection could be eliminated. He felt that a saving in the weight of castings could be achieved through research work on casting designs, and emphasized the need for standardization in railroad equipment. For example, Mr. Elsey said, some 1,700,000 railroad cars were in service in America, involving, for track and side frames, some 1,800 patterns capable of expansion to 4,300 variations. A side frame represented 7,000 lb. of castings, worth $1,400, at approximately 20 cents per pound. Standardization in this class of material should make it possible to save $100,000,000 per year through eliminating modifications which could be worked into a standardization of design. In addition, he added, some means were necessary for the foundryman to be able to prove that his control of quality was so thorough that the purchaser would not be required to spend additional money in providing a duplication of inspection. However, he said, he urged foundrymen to examine their customers' demands and explain to them those requirements that excessively increased costs. Also, the costs of rejection ought to be seriously accounted for, and the foundrymen's engineers should be sufficiently familiar with the product they were delivering, and its application.

Machine Tools

By Herbert Whitney, Kearney & Trecker Corp.

Mr. Whitney dealt with machine-tool specifications and pointed out that the industry was built upon the need to purchase "*one casting only*" in many cases. So much importance hinged upon this single purchase that he urged foundrymen to review carefully, with the patternmakers, the accuracy of dimensioned elements. Casting consumers required finer finishes and closer tolerances. Mr. Whitney said that his firm used ASTM specifications, and local inspection, on the spot, for machine-tool components. In some cases special properties in cast iron were required involving minimum tensile

* American Association of Railroads.

Sign of the Times?

strength, specific hardness, defined machining rates, desired microstructures, and a hardenability requirement associated with heat-treated parts.

Mr. Whitney said that his firm felt that foundrymen should provide quotations on costs promptly, and that they expected improvements in hardness uniformity, and in microstructure (involving grain size and graphite distribution), and that they hoped for information on the product concerning properties such as wearing quality. They were confused about whether an alloyed soft iron, or an inoculated hard iron, provided a better machine-tool casting, and felt that measures which increased casting costs but saved money in secondary processes were desirable elements for foundrymen to study. Mr. Whitney's firm felt they needed help in a better understanding of moulding and foundry practice, and their recommendations included the point that foundries should choose either to spend more money for closer technical control, or lose the corresponding amount in scrap. As a casting purchaser, Mr. Whitney felt that the consumer could co-operate in this effort by providing a quicker rejection rate when castings failed to measure up to his needs.

Discussion

An open discussion following the session brought a rebuttal from the foundrymen. They described the separate and elaborate testing and inspection factors which are brought to bear during casting inspection. The application of these tests was dependent upon the purchaser's willingness to meet the extra cost involved. If castings were purchased at a low cost, and without specific details of quality requirements, inferior material might be expected.

In reply, the purchasers summarized their requirements as follows:—

(1) Soundness; (2) Quality control through adequate inspection and tests; (3) Castings to be "accident free," and (4) Quality specification and control to be measured by reproducible methods.

Stainless-steel Conference

Producers of stainless-steel castings, meeting recently at the Heat- and Corrosion-Resistant-Alloy Castings Conference held at the International Nickel Company's Harbor Island Test Station, Wrightsville Beach, N.C. cited poor specifications as impeding their advance in producing components for nuclear-power equipment.

Surface-finish specifications were under attack by the group, which stated that some specifications were "unrealistically restrictive"—so much so that they retarded the development of more efficient power-plants. Several purchasers of castings, present for the conference, indicated that surfaces only half as smooth as those being specified at present, would be adequate for their needs. It was decided to replace specifications calling for "RMS" surface-finish by a standard named the "Cast Surface Comparator."

Book Review

Crushing and Grinding—a bibliography issued by the Department of Scientific & Industrial Research. Published by H.M. Stationery Office, York House, Kingsway, London, W.C.2; price 35s. net.

In view of the important part played by crushing and grinding equipment in a wide variety of industries, this comprehensive bibliography of published works on the subject, containing about 2,800 literature references, will be a great convenience to designers, students and users having interests in this specialized equipment.

There are two indices, giving authors' names and subjects respectively, enabling the required subject matter to be readily located in the text. The references are sectionalized under such headings as "Fundamental Aspects" dealing with theoretical considerations, "Crushing and Grinding Practice" giving practical results, and a very useful section under "Materials" dealing with specific minerals, etc. Individual types of crushers and grinding mills appear under subheadings. There are also sections on particle-size measurement, classification methods, and dust- and fire-hazards which are subjects intimately associated with the use of crushing and grinding equipment.

The bibliography is preceded by a number of papers which give a useful introduction to the various subjects in the references.

Whilst the theoretical literature may be regarded as being primarily for the designers of the equipment, users should find the operational experiences and data in the practical papers of benefit in selecting new equipment and in obtaining the best results from existing plant.

E. NORTH.

Law Case

Burned by Molten Metal

Said to have been burned by molten metal as a result of an explosion caused when he placed a skimmer which was not warm and dry on the surface of a ladle of molten iron, Mr. Peter Harding (26) was awarded damages of £53 and costs by Judge Clifford Cohen at Stockton-on-Tees County Court. The accident took place at the Thornaby foundry of the defendant company, Thomas Allan & Company, Limited.

Mr. J. A. Baldwin, for the plaintiff, said that some of the metal fell on Mr. Harding's head and some went down one of his boots. He conceded contributory negligence, but said that there would have been no injury if spats had been provided. It was, he submitted, the duty of the employers to see that workmen wore spats.

Mr. Robert Notman, foreman of the mechanical moulding foundry, said that in 34 years of foundry-work he had not seen a moulder wear spats. They hindered the job, he said. The firm did have spats in stock, however. For the company, Mr. R. P. Smith submitted that it would be wrong to attach any liability because the company did not cajole the men into wearing spats, bearing in mind the way the accident happened. The Regulations did not state that spats should be provided.

Judge Cohen, referring to a Court of Appeal and Master of the Rolls finding in a similar case, said it had then been ruled that an occupation of Mr. Harding's nature was such that the obligation was with the firm to enforce the use of protective clothing.

Increases in Capital

WHITTOME (TAVISTOCK), LIMITED, general and agricultural engineers, etc., of Tavistock (Devon), increased by £20,000, in £1 ordinary shares, beyond the registered capital of £10,000.

VOUCHER, LIMITED, engineers and machine-tool manufacturers, etc., of Walsall, increased by £20,000, in £1 7½ per cent. redeemable cumulative preference shares, beyond the registered capital of £20,000.

GEORGE TAYLOR & SONS (ACCESSORIES), LIMITED, coppersmiths, general engineers, etc., of Halesowen, near Birmingham, increased by £22,000, in £1 ordinary shares, beyond the registered capital of £8,000.

JOSEPH ROBINSON & COMPANY (HOLDINGS), LIMITED, engineers, etc., of Salford (Lancs), increased by £50,000, in 10,000 10 per cent. preference and 40,000 ordinary shares of £1 each, beyond the registered capital of £50,000.

SPENCER & SONS (MARKET HARBOROUGH), LIMITED, engineers, etc., of Market Harborough, increased by £20,000, in 18,000 ordinary shares of £1 and 20,000 deferred shares of 2s. each, beyond the registered capital of £5,000.

D. E. STUTTARD, LIMITED, mechanical engineers, etc., of Hebden Bridge (Yorks), increased by £42,000, in 10,000 founders' shares of 1s., 9,000 preference, and 32,500 ordinary shares of £1, beyond the registered capital of £5,000.

TEMPERATURE, LIMITED, refrigerating, ventilating, and general engineers, etc., of London, S.W.6, increased by £150,000, in 561,000 ordinary and 39,000 employees' ordinary shares of 5s. each, beyond the registered capital of £100,100.

W. A. TAYLOR, LIMITED, engineers, insulating and other contractors, etc., of Mitcham (Surrey), increased by £105,000, in 10,000 7½ per cent. redeemable preference and 95,000 ordinary shares of £1, beyond the registered capital of £5,000.

EDWARD YATES & SONS, LIMITED, lubricating engineers, brass founders and finishers, etc., of Marple (Ches), increased by £32,100, in 24,050 6 per cent. cumulative preference and 8,050 ordinary shares of £1 each, beyond the registered capital of £4,000.

MILLOM HEMATITE ORE & IRON COMPANY, LIMITED, London, W.C.2, increased by £2,249,900, in £1 ordinary shares, beyond the registered capital of £100. The capital is divided as follows:—50,000 "A" ordinary, 50,000 "B" ordinary, and 2,150,000 "C" ordinary.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

BEXLEY, December 31—Requirements of the Borough Council for the 12 months commencing April 1, 1959, include sundry castings, manhole covers, gully grates and frames. Documents from the Borough Engineer and Surveyor, Council Offices, Bexleyheath, Kent.

LAMBETH, December 31—Supply of iron castings required by Borough Council. Documents from the Borough Engineer, Lambeth Town Hall, Brixton Hill, London, S.W.2.

EALING, January 19, 1959—Materials required by Borough Council include iron castings. Documents from the Borough Surveyor, Town Hall, Ealing, London, W.5.

URUGUAY, December 12—Cast pipes, special parts and apparatus. (ESB/27928/58.)

PAKISTAN, January 12—Scales and weights. (ESB/29174/58/ICA.)

NEW ZEALAND, January 22—Air compressors. (ESB/29572/58.)

SOUTH AFRICA, December 18—Sludge pumps. (ESB/29563/58.)

Recent Wills

COOPER, C. D., ironfounder, proprietor of F. S. Cooper, Manchester £44,529

PIGGOTT, C. W., a director of Piggott & Whitfield, Limited, electrical engineers, of Stockport ... £16,898

PARKER, ALBERT, founder, chairman, and governing director of the Tipton Tub & Tube, Company, Limited, Tipton (Staffs) £54,316

DESCH, DR. C. H., FRS, Professor of Metallurgy, University of Sheffield, 1920-31, superintendent, metallurgy department, National Physical Laboratory, 1932-39, past president of the Institute of Metals, the Iron and Steel Institute, and of the Faraday Society £16,373

'TWAS THE NIGHT BEFORE CHRISTMAS, AND ALL THROUGH THE SHOP...

Not a casting was stirring; production had stopped.
Then suddenly there appeared in a fiery display,
Jolly old Santa, in his jet propelled sleigh.

He called to the foreman standing there in the murk,
"It's your own homemade mixes that foul up your work!"
Then he reached in his bag, and said, "Here's the trick!
A real gift to die casters—that's famous DIE SLICK."

"Fumeless and odourless, it's sweeping the nation.
9 to 12 cycles with just one application.
Five different grades that will spray on real fast—
For zinc or aluminium, magnesium or brass!"

"It cleans up the castings, won't discolour or mar . .
Try it out Boys. There's no better by far!"
So the boys sprayed it on, and with greatest of ease,
The castings came out just as slick as you please.

Try out a gallon—what can you lose?
No sticking, non-staining, so easy to use!
Don't wait for Santa—make your own test,
We'll cancel the invoice if DIE SLICK's not best.

With acknowledgements to G. W. Smith & Sons, Inc., Ohio

STERLING
DIE SLICK
the industry's standard die lubricant
W. J. HOOKER LTD
239A Finchley Road, London, N.W.3
Telephone: Swiss Cottage 3281-2-3

News in Brief

CITY ENGINEERING AND CARRON, LIMITED, of Pretoria, South Africa, have bought a 13½-acre site in Que Que, to establish a factory for porcelain enamelled baths and basins, cast-iron sanitary ware, pipes and fittings. The new foundry, which is within 12 miles of the steelworks of the Rhodesian Iron & Steel Company, Limited, is expected to be in production during 1959.

DEEPCAR WORKS AMBULANCE CORPS of General Refractories, Limited, Sheffield, held their annual dinner and presentation of awards at Deepcar on November 27. Dr. J. R. Thomason presented the individual prizes, and Dr. J. Main Russell, St. John Ambulance Brigade area commissioner, presented the team prizes. Mr. A. Ford presided.

SCOTTISH AVIATION, LIMITED, Prestwick, have received from the Ministry of Supply, an order for four more Twin Pioneers, for delivery in March. The receipt of this contract will enable the company to retain about 50 of the 370 employees who were to be dismissed this week. The company is endeavouring to get a contract for the maintenance of NATO military planes.

THE YORKSHIRE INDUSTRIAL FIRE BRIGADES ASSOCIATION will hold its first conference at Scarborough in September, 1959, when Mr. B. Jones, chief fire officer of Sheffield City Fire Brigade, will be the president. Sheffield City Fire Brigade is the pioneer in the country in having works fire brigades affiliated to it. The latest firm to affiliate is James Neill & Company, Limited, Napier Street.

ALBION MALLEABLE IRON COMPANY OF ALBION, Michigan, has signed a contract with Hierro Malleable de Mexico, S.A., for the manufacture in Mexico of the American company's products, with technical assistance from the American company. These malleable-iron products will be used in the Mexican factories producing automobile parts, domestic electrical appliances and agricultural machinery.

ASHMORE, BENSON, PEASE & COMPANY (a member of the Power-Gas group) have recently completed two ship unloaders at a new large iron and steel works at San Nicolas for Sociedad Mixta Siderurgia, Argentina. Each unloader has a 12½-ton capacity grab and is rated to handle 1,000 tons per hour of either ore or coal. Spare ore, coal and clean-up grabs, have also been supplied by the company.

THE BOARD OF TRADE announce certain changes in export licensing which came into force on December 1. Amongst these is the control figure below which manufactured goods of aluminium or aluminium-alloy require individual export licences. This has been lowered from £220 to £200 per ton. Goods of a value exceeding this figure, unless specified in the Order, are no longer subject to control.

THE MANCHESTER ASSOCIATION OF ENGINEERS will hold its annual conversazione and dance at the College of Science and Technology, Sackville Street, Manchester, on December 13. By kind permission of the College authorities the library and one or two laboratories will be open to inspection, and during the evening, in place of the usual concert, there will be a showing of films. The price of each ticket is 15s.

A NEW COMPANY, Cockshutt de Mexico, S.A. de C.V., Gante No. 7-408, Mexico, D.F., has been formed with a capital of one million pesos. The firm is affiliated to the Canadian farm-equipment manufacturer Farm Equipment, Limited, of Brantford, Ontario, which produces the English Cockshutt tractor. The purpose is said to be the manufacture of farm implements, beginning early in 1959. Capitalization appears insufficient at present to permit assembly of agricultural tractors.

THE FIRST TWO SECTIONS of the new £750,000 technical college at Waterdale, Doncaster, were officially opened on November 26 by Alderman Percy Judd, chairman of Doncaster Finance Committee. The cost of the two units amounts to £381,000, including £40,000 for furniture. They will house the building, electrical, engineering and science departments, and one portion of the household-science department in a five-storey block. The third section is now under construction.

Mr. G. P. CLAY, director in charge of safety of the Metals Division of Imperial Chemical Industries, Limited, visited the Wolverhampton factory of Marston Excelsior, Limited, a subsidiary of the group on December 1. His purpose was to present a silver trophy to the heavy-gauge fabrication department which had been judged the tidiest working area in the division. The department has some 100 workers. Marston Excelsior have achieved the commendable feat of working 1,000,000 accident-free hours five times during the past two years.

MILLSPAUGH, LIMITED, Sheffield, provided two sets of bogies to raise the steel cylinder, 120 ft. long and 13-ft. dia., which had been floated across the Irish Sea from Birkenhead to Cork over the weekend of November 22 for an oil refinery. The bogies are for the 90-ft. long feed splitter towers already made by Millspaugh for the refinery. The cylinder weighing 50 tons was made at Stockton-on-Tees, and the bogies were used to raise it out of the sea at the end of its journey to Cork. The splitter towers were previously towed across by a tug, but the cylinder was the largest item yet taken over.

MODERN ELECTRO PLATING (KENT) COMPANY, LIMITED, Slade Green Road, Slade Green, near Erith, Kent, have installed the latest type of fully-automatic plating plant. It is in full production, and manufacturers can now be offered a contract zinc and cadmium plating service. The plant, which is believed to be the only automatic zinc and cadmium plating plant operated by a British out-work plating firm, is particularly suitable for plating all types of steel components up to a weight of about 65 lb. and a length of 30 in. in rod form, or dimensions of 30 by 15-in. in sheet form.

THE BIRFIELD GROUP has announced that it is to offer up to three university scholarships in any year from 1959 which will enable successful applicants to receive the training, and experience necessary to become a chartered member of one or more of the engineering institutions, mechanical, production or electrical. The scholarships will provide for university and college dues and fees plus a salary, varying from £325 a year to £350, over a three-year course. This will be followed by an engineering apprenticeship normally of two years' duration, and the final stage will be a staff appointment within the group.

SUGGESTIONS that displays on an international scale should be held in the new exhibition hall which Birmingham proposes to build, were enthusiastically received at the annual luncheon of the Birmingham Consular Association. "I hope they will be specialized exhibitions; I am absolutely convinced that they are the only ones with a chance of permanent success," said Mr. J. Rogister, Consul for Belgium and president of the Association. The Belgian Ambassador, Mr. R. L. Van Meerbeke and Mme. Meerbeke, who were among the principal guests, later visited the Austin works at Longbridge.

(*Continued on page* 700)

Electrical Aids in Industry *Data Sheet* **No. 4**

Resistance Heating – 1

In this form of heating, the heat is produced by passing an electric current through a high resistance conductor which is termed the "heating element".

The heat is transferred from the heating element to the work by convection, radiation or conduction or by a combination of any, or all, of these. When it is a question of radiation or convection, the element can be a bare wire or strip of suitable material, provided it is adequately supported on electrical insulation capable of withstanding the temperature.

When there is to be contact between the work and the element, heat being transferred to the work by conduction, the wire or strip must be surrounded by suitable insulating material and enclosed in a protective sheath.

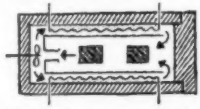
In the majority of cases, the wire or strip forming the heating element is made of a nickel-chromium alloy which has a high electrical resistance and can be safely used in air at temperatures of up to 1050°C., or in a suitable atmosphere, of up to 1150°C. Other element materials are available for use at higher temperatures.

Electric resistance heating may profitably be put to many diverse uses; two of these are described briefly below, others will be listed in a subsequent data sheet.

Furnace Heating

Electric resistance furnaces can be divided into two main categories, batch type and continuous. In most cases, the heating elements are of nickel-chromium alloy, for furnace temperatures up to around 1050°C., but higher temperatures, up to nearly 3000°C., can be obtained by using other metals or alloys, or in some cases non-metallic elements. A protective atmosphere is desirable to prolong the life of some of these higher-temperature elements. For all temperatures, electric resistance furnaces can be constructed so that the heating process takes place in a controlled atmosphere if this is dictated by the composition or heat requirements of the work charge. In some furnaces, fans are used to circulate the air or special atmosphere over the charge, thereby giving increased heating rates and a uniform temperature over the whole charge.

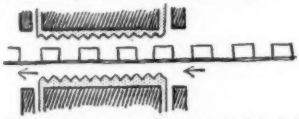
Automatic temperature control and programme control of the heating process are readily effected.



Electric furnaces are extensively used in industry, for example in the general heat treatment of metals, in the glass and ceramics industries, for brazing and sintering, and for many other applications requiring temperatures above 500°C.

Oven Heating

There are two basic forms of heat transfer used in electric resistance ovens; convection and radiation. The latter is dealt with in a separate data sheet under the heading "Infra-Red Heating".



Convection ovens may again be of the batch or continuous type. In either case, the charge is heated mainly by the movement of hot air, which is sometimes assisted, as in furnaces, by fans to give a rapid and uniform temperature rise. Ovens are normally designed for temperatures of up to about 500°C., and the heating elements are invariably of nickel-chromium or nickel-chromium-iron alloy.

Ventilation, when required, can be provided and regulated entirely to suit the heating process. Temperatures and times are readily controlled. A vacuum can be maintained in suitably designed ovens to assist in the extraction of moisture and solvent.

Convection ovens are extensively used for drying, baking and stoving operations, and for a host of other processes requiring a low or medium temperature.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, W.C.2.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available—"Induction and Dielectric Heating" is an example; "Resistance Heating" is another.

E.D.A. also have available on free loan a series of films on the industrial use of electricity. Ask for a catalogue.

6780/4

(*Continued from page* 698)

News in Brief

COL. C. A. B. LINDOP, chairman and joint managing director of H. W. Lindop & Sons, Limited, said at the annual general meeting of the company in Birmingham, on November 20, that the output of castings from both the parent company and its subsidiary, Malleable, Limited, increased on that of a year ago and constitutes a record in the history of both firms. Col. Lindop added that "although the order book to-day is still good, many of our customers have held up or put back delivery of their orders, this position being common throughout the trade." The company, Col. Lindop disclosed, is installing a mechanized sand-preparation plant which is expected to come into operation early in 1959.

SINCE 1924, the American Foundrymen's Society has sponsored apprentice contests to stimulate the development of individual skills and craftsmanship in pattern-making and the foundry trades. The contests have been a distinct help in fostering increased interest in apprentice training and other aspects of in-plant training in the metal-castings industry. Three types of local elimination contests are conducted across the country: AFS Chapter contests, single plant competitions and inter-plant competitions in which three or more plants participate. Winners in the local elimination contests then advance to national competition. Based on the number of early entries for 1959—216 since the opening date of October 1—the record of 600 entries in the 1958 competitions will be far surpassed.

THE DUKE OF EDINBURGH opened a new £750,000 research building at the Ferodo Works, Chapel-en-le-Frith, Derbyshire, on November 21. He toured the works and talked to some of the 3,000 employees. He later opened the British Coke Research Laboratories at Wingerworth, near Chesterfield, where he also toured workshops and test plant. Earlier, he had opened extensions to the nine-storey Chesterfield College of Technology, when he said "If anyone tells you that there is not a better way of doing something, he is either a supernatural being or a supernatural clot. The ability to use your brain intelligently, constructively and with imagination, is not just a requirement for bosses and heads of departments. It is an absolute requirement for anyone who wants to be a useful member of a team."

OVERSEAS EXECUTIVES of the Standard Motor Company, Limited, and its associated companies, who were attending a conference in Coventry, held a press conference on November 25, to outline sales problems in their areas. Mr. B. Couzens for the European area said that the chief competitors in the European market to-day were the German, French and Italian manufacturers in that order of market penetration. Referring to the European Common Market plan which comes into operation on January 1, Mr. Couzens said that the tariff disadvantage which the UK will suffer was "not catastrophic." He added that "we firmly believe that a Free Trade Area, doubtless in some modified form, will be achieved before tariffs and quotas disappear completely from the common market area." At the close of the conference Mr. Alick C. Dick, managing director, forecast an increase of at least 55 per cent. in the company's exports in the current financial year. In the last financial year, he said, Standards exports rose by 48 per cent.

THAT THERE WAS NO LIKELIHOOD of the short-time working, which is to operate in the foundry of Herbert Morris, Limited, Loughborough, Leicestershire, spreading to other departments was the assurance given by Mr. D. M. Lawson, director and secretary of the firm, on November 28. In future, he said, foundry employees, numbering just over 90, would have a long "weekend" once a fortnight, Friday and Monday becoming non-working days. One reason for this decision was a slight falling-off in orders, but an even more important one was the position revealed in a recent review of stocks, as the accumulation of iron castings were more than adequate to cover orders in hand. Pointing out that only a small proportion of the firm's 2,000 employees were affected, Mr. Lawson added that so far as he could see, the four-day week in the foundry would be only a temporary measure. The move follows one of the firm's best trading years, which made possible the announcement, only the previous week, that all employees who have been on the payroll since August 1 last year, would be receiving a special bonus equal to one week's pay.

MR. T. H. BURLEIGH, managing director of Firth Brown Tools, Limited, Sheffield, presented the main awards at the annual apprentices' prize distribution at the works canteen, Carlile Street, on Friday, November 21. The apprentices' training trophy for academic achievement was won by 21-year-old Martin J. Wiseman, a research assistant who is studying for the Higher National Certificate in metallurgy. Mr. Fred Hunt presented the foremen's special cup for practical endeavour to 17-year-old Raymond Joyce. Mr. C. A. Grayson, a director, presented more than 50 prizes for school work. Mr. K. Wainwright, the labour manager said in his report on the year's training activities that although the reduced volume of work going into their factories had meant a slowing down in the rate of progress from semi-skilled to skilled apprentices, newcomers would still have good opportunities and in ten years' time, would find even greater chances of making good. He added, "Training schools are producing a steady stream of promising young men who will rise to these opportunities, and recent developments include a post-graduate training scheme in mechanical engineering with a later view to filling responsible positions in the firm." Guests included heads of local technical schools, youth employment officers, parents and foremen.

MR. G. NEVILLE SPERRYN, chairman of the Overseas Trade and Tariff Committee of the Birmingham Chamber of Commerce, told members of the Chamber at their meeting on November 24, that it was no longer possible for a land mass the size of Europe to be divided into small sections either politically or economically, and although British manufacturers had been reluctant to give the Free Trade scheme their blessing they now regarded a trade agreement as vital to European unification. Mr. G. Philip Achurch, treasurer of the Birmingham Chamber, said that the Free Trade issue was far more important than the general public realized. The man in the street had not been fully informed on what was involved. He said that he considered the Common Market would cause inflation if it proceeded alone but the larger European Free Trade Area scheme would have the reverse effect. Mr. J. E. Belliss, past-president of the Chamber said that it was wrong to suppose that Britain had no alternative to joining the Free Trade Area scheme. If that plan failed, action could be taken in the Commonwealth where the largest exporting and importing markets in the world were available to the UK. The Birmingham Chamber decided to pledge its strongest support to efforts by the Government to bring the talks on the creation of a European Free Trade Area to an early and successful conclusion. It also resolved to send strong protests to the New Zealand authorities and the Board of Trade over the import restrictions introduced by New Zealand.

This Crucible has done 255 heats on phosphor-bronze and gunmetal

Our illustration shows one of CARBORUNDUM'S TT400 crucibles after no less than 255 heats on phosphor-bronze and gunmetal in the Holfos foundry of John Holroyd & Co. Ltd. of Rochdale. This is published as an outstanding performance by a good crucible in good hands.

A Product by

CARBORUNDUM

TRADE MARK

THE CARBORUNDUM COMPANY LIMITED, TRAFFORD PARK, MANCHESTER 17 Phone: TRAfford Park 2381

Personal

Sir HAROLD SMITH, secretary of the Gas Council, is to be made an honorary Doctor of Law of Leeds University at a Congregation to be held on May 14, 1959.

Mr. K. S. PHILLIPS, BSC.(ENG.), has been appointed sales controller of Research and Control Instruments, Limited. Among other duties, he will be responsible for the co-ordination of all sales staff activities.

Mr. G. T. FROST has been appointed area sales engineer for the Eastern section of the London district for William McGeogh & Company, Limited, brassfounders, etc., Warwick Works, West Bromwich, and Glasgow.

Firth Cleveland Tools, Limited, Tipton, Staffs, announce the appointment of Mr. F. A. FIELD as general sales manager. For many years Mr. Field held a similar executive position with Black & Decker, Limited.

Mr. ALFRED PELL, of the civil engineering department of Newton Chambers & Company, Limited, Chapeltown, Sheffield, has retired after 54 years' service, at the age of 68. His family has served the firm for at least three generations.

Mr. A. R. FORD, managing director of Vowles Aluminium Foundry Company, Limited, leaves the company at the end of the year to join the Barton group of companies as managing director of the Premier Aluminium Casting Company, Limited.

Mr. F. CHAMBERLAIN, foreman of the dial-marking department of George Salter & Company, Limited, West Bromwich, has been presented with a cheque by Mr. R. P. S. Bache, managing director, on his retirement at the age of 80 after 66 years' service.

Mr. E. G. PARRAMORE, representative of Plessey International, Limited, electrical equipment exporters, of Ilford (Essex), in Amsterdam, has been awarded the Knighthood of the Order of Orange-Nassau in recognition of his distinguished services to the Netherlands

Mr. FRANCIS H. MOUNTAIN, who is in charge of the supplies section of the railway-siding department of Thos. W. Ward, Limited, Albion Works, Sheffield, received presentations on November 27, in recognition of the completion of 50 years' service with the firm.

Mr. HERBERT RAYSON, manager of the test house at the Cleveland works of Dorman, Long & Company, Limited, Middlesbrough, on his recent retirement, was presented with a number of gifts subscribed to by steel surveyors representing buyers from many parts of the world. He also received gifts from the management and from his staff.

As part of the long-term reorganization of the A.E.I. group, Siemens Edison Swan, Limited, are shortly to be divided into three divisions: cables, telecommunications and radio and electronic components. Controlling these divisions will be Mr. J. S. A. BUNTING, Mr. W. G. PATTERSON and Mr. J. W. RIDGEWAY who will hold appointments on the board of A.E.I. Divisional Management Company, Limited.

Mr. ALFRED STEWART, who has been works manager at the Chadderton factory of A. V. Roe & Company, Limited, since 1955, has been appointed assistant general manager (missiles) at the company's Weapons Research Division at Woodford (Cheshire). Mr. Stewart joined the company in 1925; in 1941 he was appointed Avro representative for the British Government to establish Lancaster production in Canada. He became experimental manager in 1945, production controller in 1949 and then works manager.

Joint deputy managing director of the Power-Gas Corporation, Limited, Mr. R. W. RUTHERFORD has been appointed chairman of Nuclear Chemical Plant, Limited. Mr. C. GRESLE FARTHING, deputy chairman and joint managing director of Humphreys & Glasgow, Limited, and Mr. J. H. N. THOMPSON, deputy chairman and joint managing director of John Thompson, Limited, have been made directors. Mr. C. J. CARTER, a director of John Thompson-Kennicott, Limited, Mr. C. ROBSON, a director of the Power-Gas Corporation, and Mr. N. H. WILLIAMS, a director of Humphreys & Glasgow, are appointed alternate directors. Mr. R. JOWITT (Humphreys & Glasgow) is appointed general manager and Mr. E. L. J. GOOD (Power-Gas Corporation) secretary. The members of the staff who are being trained by the United Kingdom Atomic Energy Authority at the Authority's industrial group at Risley are Mr. J. S. M. JONES (Humphreys & Glasgow), Mr. E. G. SPALDING (John Thompson), and Mr. N. E. WILLIAMS (Power-Gas Corporation).

Obituary

Mr. THOMAS F. STEWART, chairman of Duncan Stewart & Sons, Limited, coppersmiths, Glasgow, has died at the age of 91. The business was founded by his grandfather in 1816 and has remained in the control of the family since then.

The death has taken place of Mr. JOHN D. VAUGHAN, official director and formerly chief engineer of Horseley Bridge & Thomas Piggott, Limited, constructional engineers, ironfounders, etc., of Tipton (Staffs). Mr. Vaughan, chief engineer for four years from 1950, was appointed to the board in 1954.

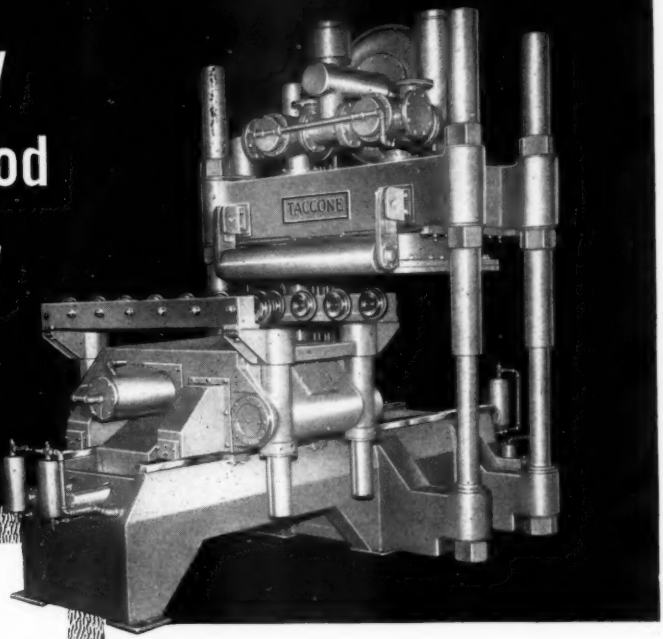
BCIRA Appointments

In view of the retirement of the director of the British Cast Iron Research Association, Dr. J. G. Pearce, C.B.E., at the end of December, the following appointments with effect from January 1, 1959, have been made by the Association's Council: Mr. H. Morrogh, now deputy director, is to be director, and Dr. H. T. Angus, now assistant director, to be deputy director, Mr. T. E. Whiteside, A.C.A., will continue as secretary with special duties with respect to the Association's finances. (An appreciation of the services of Dr. Pearce to the foundry industry is to be printed in an early issue of this JOURNAL.)

IN A PARAGRAPH published in the JOURNAL of November 27, reference was made to the retirement of Alderman A. Paddon Smith, J.P., Joseph Lucas, Limited, and among other things it was stated that he is chairman of the Midland branch of the National Union of Manufacturers. This body points out that some years ago Alderman Paddon Smith was chairman of the Midland Council of the NUM, but the present chairman is Mr. Gilbert Salter, M.B.E. Alderman Paddon Smith is now one of the vice-presidents of the Midland branch of the National Union of Manufacturers.

HARLAND & WOLFF, LIMITED—Mr. J. S. Baillie has been appointed deputy chairman. He joined the company at Belfast in 1913 and was transferred to London in 1924, Mr. Baillie, who has been a director since 1948, will continue to act as the company's London manager.

An entirely NEW method of Foundry Moulding



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'TACCONE' HIGH PRESSURE DIAPHRAGM MOULDING MACHINE

The 'Taccone' machine makes precision green sand pressure moulding available to every foundry. It ensures sound, accurate castings and the moulds it produces are superior to those made by conventional equipment. 'Taccone' moulds are consistently hard and uniform throughout and can be effortlessly produced by unskilled labour.

All types of pattern equipment, including plaster, wooden, plastic and metal patterns can be used, and there is practically no limitation on the size of flask employed. 'Taccone' machines are handling flasks 8′ x 8′ (larger sizes are envisaged) and already over 200 'Taccone' installations in operation.

The dimensional accuracy and finish on the castings is comparable with work produced by shell moulding techniques.

The 'Taccone' is more than a machine, more than a process — it is a revolutionary system for rapid mould production.

Ten standard machines are available in the manufacturing range and special machines can be built to any size for any purpose.

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Raw Material Markets

Iron and Steel

For the remainder of the year there is unlikely to be much variation in the trading position at the ironfoundries. Business continues on much the same lines, with varying degrees of activity at the different types of foundries, although most establishments are seeking more work, particularly for forward bookings, to enable production to be nearer capacity level.

Most of the engineering and speciality foundries, while not under heavy pressure for supplies of high-duty castings, are fortunately able to maintain reasonably good outputs. Those foundries catering mainly for the motor-car industry continue reasonably well employed, although the pressure is slackening. The overall requirements of other users provide the foundries connected with them with fairly good levels of outputs, but, from a number of trades, including motor tractor, machine tools, heavy engineering, railways, and steelworks, which utilize high-duty castings, present demands show a decline on previous orders.

Although the light foundries have been striving for some long time past to improve their production, increased business has not been available and most of them continue only moderately employed. The jobbing foundries are fairly well employed, but could undertake more business, while most of the textile foundries are only partially employed.

In the present state of trade demands for pig-iron vary. Only the engineering and speciality foundries are able to specify reasonably good tonnages, mostly in the low-phosphorus grades, coupled with supplies of hematite and in some cases refined irons. The call for high-phosphorus iron from the light, jobbing, and textile foundries continues very moderate. All grades of pig-iron are in good supply, with production much in excess of demands. The furnaces hold substantial stocks, and deliveries could be stepped up considerably. Stocks of raw materials at the foundries are being kept at minimum levels.

Generally, scrap supplies are adequate, although there are many demands for parcels arising of the better and heavier grades of cast-iron and machinery scrap. Foundry coke deliveries are satisfactory, and ganister, limestone, and firebricks are available on demand.

The re-rollers continue only moderately employed and most of them are working short time. Even with this reduced rate of production, difficulty is experienced in obtaining sufficient orders to make up rollings, as demands for small bars and light sections show no appreciable improvement. The call for reinforcing material is on a fairly good scale. Although a number of inquiries are being received from overseas customers, orders are difficult to obtain against the severe competition from makers abroad, and only for special-quality steels is there a chance of securing business.

Home steelworks can supply present demands for steel semis without difficulty, and could undertake a much larger tonnage than that now being specified.

Non-ferrous Metals

Copper prices have declined during the past few days, consumer demand being at a low ebb. Refined copper stocks in London Metal Exchange official warehouses last week rose 250 tons further to a total of 6,471 tons. Some 40,000 African mineworkers on the Northern Rhodesian Copperbelt have been awarded a 15s. a month pay increase. Africans working afternoon and evening shifts will get an extra 15s. a month on their shift differential bonus under the wage award. The Chamber of Mines and the Northern Rhodesian African Mineworkers' Union have agreed that it should remain in force for 18 months. The two parties have also agreed not to vary the new wage levels except in the event of a major economic upheaval.

Day-to-day price movements in tin have been insignificant, the market continuing to present a steady appearance. A certain amount of selling has been evident, but this has been well absorbed in spite of lower eastern advices and the quietness of outside demand. The severe rate of export cutbacks is a sustaining factor in the market. Tin stocks in London Metal Exchange official warehouses last week were 37 tons lower at 17,356 tons. Shipments of tin from Malaya during November, it is reported, were 4,185 tons, 17 per cent. above the October figure and the highest since February. Exports to India increased by 484 tons to 673 tons, while shipments to the United States and Japan also registered increases.

It is reported from Singapore that the chief economic result of the visit by Mr. John Diefenbaker, the Canadian Prime Minister, to Kuala Lumpur has been the immediate easing of restrictions of Canadian dollar imports into Malaya. Mr. Diefenbaker urged a greater trade between the two countries and stated that Canada intended buying more tin from Malaya. He said that Canada would only purchase tin from those countries adhering to the international tin agreement.

In the absence of any news of a stimulating nature, the lead market has been dull. Zinc has also been somewhat subdued, lower prices being attributed to small end-month sales.

The Board of Trade, in an explanatory note about export licences for non-ferrous metal scraps, wastes, and residues, states that it is prepared to consider applications for export licences in certain cases.

Where the applicant can satisfy the Board that he has the material in stock or can readily obtain supplies:—(1) Collected contaminated nickel silver. (2) Certain nickel alloys, wastes, and residues not normally used in the manufacture of steel or of non-ferrous alloys. (3) Tungsten metal scrap. (4) Molybdenum metal scrap.

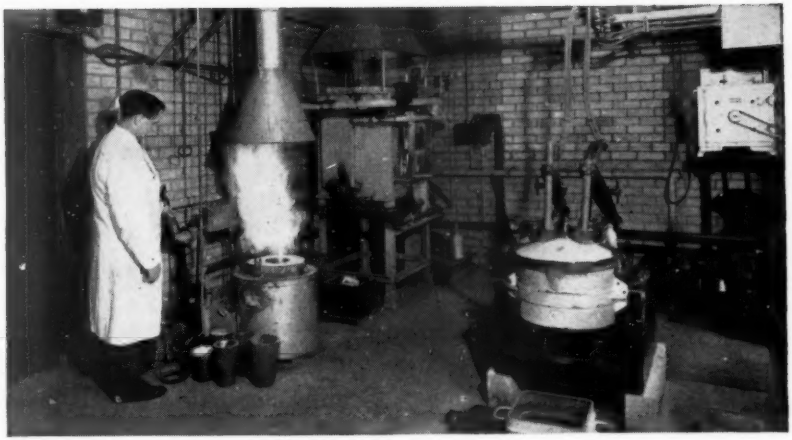
Where the Board is satisfied that the applicant has the material in stock, or can readily obtain it, and has offered it to consumers in the United Kingdom who have declined to purchase it, the Board will also consider applications for the export of the following:—(i) Beryllium copper scrap. (ii) Zinc wastes and residues. (iii) Tantalum scrap and tantalum-cobalt scrap and residues. (iv) Cobalt waste and residues. (v) Cadmium wastes and residues, and cadmium battery plates. (vi) Germanium metal scrap. (vii) Remelted zinc.

Whenever the Board considers that a surplus exists, it will be prepared to consider applications to export any non-ferrous metal scraps, wastes, and residues. A marked fall in the price in the United Kingdom of a material may be evidence of a surplus.

Metal Statistics

The 45th annual issue of "Metal Statistics," published by Metallgesellschaft A.G., Reuterweg 14, Frankfurt am Main, gives information covering the years 1948-57. Tables are included in respect of aluminium, lead, copper, zinc, tin, cadmium, magnesium, nickel, mercury, and silver. The comprehensive statistical section is prefaced by a review of the metal industry in 1957 and the first half of the current year.

Finding the



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If you should be faced with a technical problem in connection with casting defects in foundry sands, you are invited to call on the facilities of our experimental foundry and sand testing laboratory. In addition, our foundry technicians will be pleased to visit any foundryman who might wish to discuss a particular difficulty on the spot. These 'Fulbond' services are offered without charge and are, of course, entirely confidential. If you will kindly telephone or write to us, we shall be very pleased to co-operate in finding the answer to your problem.

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CMF45

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

December 3, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £44 0s. 0d. to £44 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £58 0s. 0d. to £62 10s. 0d., scale 16s. 0d. to 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 8s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 11s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £83 10s. 0d. to £87 0s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £79 10s. 0d. to £85 0s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 10d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £73 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £66 16s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £219 0s. 0d. to £219 10s. 0d.; three months, £219 10s. 0d. to £220 0s. 0d.; settlement, £219 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 2¾d. per lb.; rods, 249s. 0d. per cwt. basis; 20 s.w.g., 284s. 0d. per cwt.

Tin.—Cash, £754 10s. 0d. to £755 0s. 0d.; three months, £757 0s. 0d. to £758 0s. 0d.; settlement, £755 0s. 0d.

Lead (Refined Pig).—First half December, £71 10s. 0d. to £71 12s. 6d.; first half March, £71 10s. 0d. to £71 12s. 6d.

Zinc.—First half December, £72 0s. 0d. to £72 10s. 0d.; first half March, £69 10s. 0d. to £69 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £109 5s. 0d.; rolled zinc (boiler plates), all English destinations, £107 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £97 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 9¾d. per lb.; sheets to 10 w.g., 193s. 0d. per cwt.; wire, 2s. 7¾d.; rolled metal, 193s. 0d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £147; B6 (85/15), —: BS249. —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £184; HTB2 (38 tons), —; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £183; LG3 (86/7/5/2), £192; G1 (88/10/2/½), £251; (88/10/2/1), £241.

Phosphor Bronze.—BS1400, PB1 (AID released), £274 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £216 per ton.

Phosphor Bronze Strip, etc.—Strip, 282s. 3d. per cwt.; wire, 4s. 0d. per lb.; rods, 3s. 3½d.; tubes, 3s. 3½d.; chill cast bars: solids 3s. 3d.; cored 3s. 4d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £74 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £227; AB2, £238.

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